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Volume II

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Evaluation of EIS Alternatives by the Science Integration Team Volume II

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CHAPTER 4

Historical and Current Status of Terrestrial Species and the Effects of Proposed Alternatives

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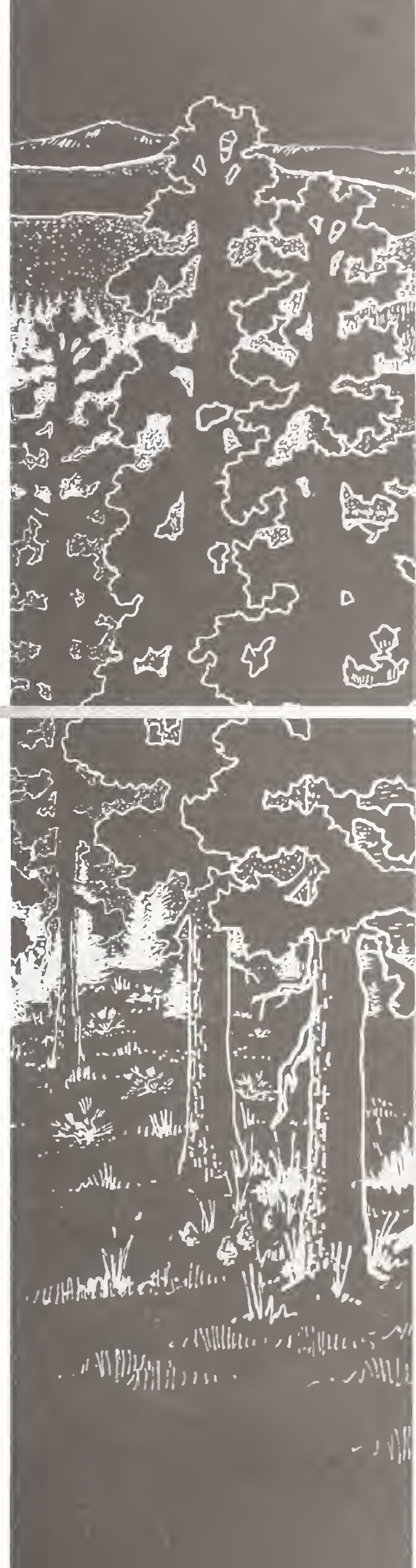

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Methods for Assessing Effects on Terrestrial Species

The purpose of this analysis is to provide an assessment of the degree to which habitat conditions on lands administered by the Forest Service (FS) and Bureau of Land Management (BLM) within the Basin[1] contribute to long-term persistence (at least 100 years) of plants and animals. Secondarily, we examine the extent to which other lands and other influences might affect populations of species over and above the influences of habitat conditions on federally administered lands. This assessment is not a quantitative population viability analysis as it does not employ an explicit model of genetic or demographic risk to species persistence. Rather, we view our assessment as a structured and reasoned series of judgments about projected amounts and distributions of habitat and the likelihood that such habitat would allow populations of selected species to persist over the long run. The assessment meets the essential criterion of a population viability analysis, to provide an estimate of the likelihood that a population will persist to some arbitrarily chosen future time (Boyce 1992). However, it does so through the use of structured professional judgment rather than through the use of population projection models. The methodology and its limitations are discussed below.

Methods for Assessing Species and Habitat Outcomes Under the Preliminary Draft EIS Alternatives

The process for assessing species and habitat outcomes in the Columbia River Basin drew on previous efforts, such as that conducted by the Forest Ecosystem Management Assessment Team (FEMAT) in 1993, and also drew substantially on efforts made as part of the Interior Columbia Basin Ecosystem Management Project (ICBEMP) assessment during 1994 and 1995. The objective of this assessment was to provide decision makers with as much information as possible about the expected effects of the preliminary draft Environmental Impact Statement (EIS) alternatives on species habitats and populations (appendix 1). This assessment does not provide a quantified measure of viability, but instead, provides information needed to assess alternatives relative to the National Forest Management Act, the Endangered Species Act, the National Environmental Policy Act, and other decision criteria.

Overview of the assessment process — Assessments were based on expert opinion concerning the likely outcome for species and their habitats under a variety of possible management alternatives. Expert judgments were solicited from eight expert panels (appendix 4-A). The panels were provided with the following information:

(A) Species information

- Maps of species' ranges within the Basin.[2]
- Maps of vascular plant species' locations.[2]
- Tables of species' habitat associations.[2]

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[1]The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those portions of the Klamath River basin and the Great Basin in Oregon.

[2]Source: Species-Environment Relations (SER) database. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

- Information on documented population declines or increases.[3]
- Information on general species' abundance.[3]
- Information on species' demographic characteristics, where known.[3]

(B) Information on the alternatives

- Extent of species' habitats, as defined by vegetation communities, at three points in time (under historic conditions, under current conditions, and under conditions projected 100 years into the future) under each of the alternatives.[4]
- Maps of management prescription allocations by alternative.[4]
- Maps and tables of vegetative community types projected over the next 100 years.[4]
- Information on types of land management activities planned under each of the alternatives.[4]
- Tables showing the amount of area that would be affected by activities under each alternative.[4]
- Qualitative estimates of grazing effects, fire effects, and the extent of silvicultural activities under each of the land management prescriptions which were made by the Landscape Team. These estimates would be used to implement the alternatives.
- Maps of biological reserves for alternatives where new reserves would be designated.[5]
- Descriptions of riparian management strategies for each alternative.[5]
- Specific standards under which activities will be conducted.[5]

Species' habitat area tables, provided to the panels, were developed using (1) the habitat relations contained within the SER database, and (2) the vegetation projections completed for the landscape analysis (see footnote 4). The SER database was used to determine which vegetation types are suitable habitat for the species. The areas of suitable vegetation types (that is, within the species' ranges) were then summed. The projections made for the landscape analysis and used for this assessment incorporated management effects, successional processes, and stochastic effects such as insect irruptions and large-scale wildfires.

Based on the above information, the experts were asked to make judgments about the likely distribution of each species and its habitat. Judgments were made for each of the three timeframes (historic, current, and future) under each preliminary draft EIS alternative (see appendix I). These judgments were made separately for each of the two EIS areas, eastern Oregon/Washington EIS (EEIS), and the Upper Columbia River Basin (UCRB) EIS. For each timeframe and EIS area, the experts were asked to make two distinct judgments. The first judgment rated the likelihoods of species' distribution, based only on habitat conditions on Federal lands and the natural history characteristics of the species. The second judgment was a cumulative effects analysis of the likely condition of species' populations across all ownerships in each of the two EIS areas. This took into account habitat conditions across all ownerships, natural history of the species, and all other influences on the species (for example, water pollution

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[3]Sources: SER database and species-specific literature reviews. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

[4]Source: Chapter 2. Landscape Ecology, Landscape Team projections of vegetation.

[5]Source: (Chapter 3, Description of Alternatives). U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, Bureau of Land Management. February 1996. Interior Columbia Basin Ecosystem Management Project; Upper Columbia River Basin Preliminary Draft Environmental Impact Statements. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

and trapping). Thus, the first judgment was based on the likely effect that Federal land habitat conditions would have on the species; whereas, the second judgment was directed toward the actual population, and considered all lands and other influences.

Expert judgments were registered through a process of likelihood voting, using a structured outcome scale. The outcome scale depicted five distinct possible outcomes for each species and/or its habitat, described in detail in the "Outcome scale" section below. The individual outcomes represented points along a gradient ranging from a broadly-distributed condition with a high likelihood of persistence, to a poorly-distributed condition with a high likelihood of extirpation. For each judgment, each expert spread 100 likelihood votes across these five outcomes. Any distribution of the votes was considered legitimate, as long as all 100 votes were used. Placing 100 votes on a single outcome indicated much certainty in that outcome. Spreading the votes among several outcomes indicated less certainty in any one outcome.

The uncertainty reflected in the likelihood voting technique stemmed from different sources in the historic, current, and future judgments. In the historic judgment, sources of uncertainty included the historic habitat projection and the knowledge of the relationship of species to that habitat. In the judgment of current condition, sources of uncertainty included the habitat maps, the current distribution and condition of species' populations, and the relationship of species to habitats. In future judgments, sources of uncertainty included the habitat projection, the relationship of species to habitat, and the unforeseen future events that might influence land management and the habitat response to that management.

Experts made their judgments independently after reviewing the information presented in the panel. Then, having made their initial independent judgments, the experts discussed the basis for their decisions. Following this discussion, final judgments were made which sometimes differed from the initial judgments. Consensus was not an objective of the process and was not sought.

Outcome scales —The following are the distinct outcomes that were used in the likelihood voting process to describe the likely species status that could be supported by habitat conditions. The first set of outcomes are those habitat conditions found on FS- and BLM-administered lands.

Outcome 1. Habitat is broadly distributed across the planning area with opportunity for continuous or nearly continuous occupation by the species and little or no limitation on population interactions.

Outcome 2. Habitat is broadly distributed across the planning area, but gaps exist within this distribution. Disjunct patches of habitat are typically large enough and close enough to other patches to permit dispersal among patches and to allow species to interact as a metapopulation.

Outcome 3. Habitat exists primarily as patches, some of which are small or isolated to the degree that species interactions are limited. Local subpopulations in most of the species' range interact as a metapopulation, but some patches are so disjunct that subpopulations in those patches are essentially isolated from other populations.

Outcome 4. Habitat is typically distributed as isolated patches, causing strong limitations for population interactions among patches and limited opportunity for dispersal among patches. Some local populations may be extirpated and rate of recolonization will likely be slow.

Outcome 5. Habitat is very scarce throughout the area with little or no possibility of interactions among local populations, strong potential for extirpations, and little likelihood of recolonization.

The second set is the cumulative effects outcome scale. The outcome scale for cumulative effects judgments is similar to the previously described scale, but differs in that it emphasizes actual conditions of populations. Outcomes are as follows:

Outcome 1. Populations are broadly distributed across the analysis area with little or no limitation on population interactions.

Outcome 2. Populations are broadly distributed across the analysis area but gaps exist within this distribution. Disjunct populations are typically large enough and close enough to other populations to permit dispersal among populations and to allow species to interact as a metapopulation.

Outcome 3. The species is distributed primarily as disjunct populations, some of which are small or isolated to the degree that species interactions are limited. Local subpopulations in most of the species' range interact as a metapopulation but some populations are so disjunct that they are essentially isolated from other populations.

Outcome 4. Populations are typically distributed as isolated sub-populations with strong limitations in interactions of sub-populations and limited opportunity for dispersal among patches. Some local populations may be extirpated, and rate of vacant habitat recolonization will likely be slow.

Outcome 5. Populations are highly isolated throughout the area with little or no possibility of interactions among local populations, strong potential for extirpations, and little likelihood of vacant habitat recolonization.

Panelists were instructed to consider these outcomes in an absolute way when making their judgments. For example, if habitat for a species on Forest Service- or BLM-administered land existed as two large patches separated by non-Federal land, and the species' natural history would limit interchange among those patches, the Federal land judgment would describe the resulting condition as Outcome 2. Similarly, if a species and its habitat existed in a naturally patchy condition, its historic condition would be described as Outcome 3 or 4, depending on the species' natural histories. Its current and future condition might decline to Outcomes 4 and 5, depending on past and proposed management. Some outcomes may not be applicable to all taxa. For example, many amphibians occur naturally in a localized or patchy distribution, and thus, never would occur in the conditions described in Outcomes 1, 2, or 3. This point was emphasized to the panelists in order to avoid the tendency to consider the "best possible" outcome for each taxon to be Outcome 1.

The term "habitat" in the outcome descriptions was defined as primary habitat capable of supporting a self-replacing population. Thus, the assessment was intended to focus on the pattern of source habitat, rather than mixing source and secondary habitats.

Factors considered in judgments—As noted earlier, the experts were asked to make a judgment based on Federal habitat and a cumulative effects judgment. They were instructed to base the Federal habitat judgment on species' response to the following factors:

1) amount and distribution of Federal habitat,

2) severe population decline associated with habitat, and

3) environmental stochasticity and natural catastrophes.

They were instructed to base the cumulative effects judgment on likely population response to all of the following factors:

1) Federal habitat,

2) severe population decline associated with habitat,

3) environmental stochasticity and natural catastrophes,

4) non-Federal habitat, and

5) non-habitat effects.

The following definitions of each of these factors were provided to the experts to help assure consistent interpretation.

Federal habitat: the amount and distribution of source habitat available to the species on BLM- or Forest Service-administered lands, within the EIS area, and at the specified time of the judgment.

Non-Federal habitat: the amount and distribution of source habitat available to the species on lands other than those administered by the BLM or Forest Service, within the EIS area, and at the specified time of the judgment.

Range outside plan area: that part of the species range that falls completely outside of the EIS area, and the associated influences stemming from that area. Ranges outside of the EIS area were only considered in judgments for species on the periphery of each EIS area. In these cases, failure to consider ranges outside the EIS area would have produced misleading judgments about population isolation.

Non-habitat effects: all influences on the species population that are not the direct result of habitat management. Examples would include hunting, illegal taking, pesticide effects, air pollution effects, fishing, and water pollution effects.

Severe population decline associated with habitat: this factor is included to reflect any bottleneck events caused by habitat reduction that are likely to occur prior to the specified time of the judgment, and which would influence the likelihood that the species population would still respond (in a predictable way, and at the specified time of the judgment), to habitat availability.

Environmental stochasticity and natural catastrophes: this factor is included to reflect random environmental variation that would influence the likelihoods of species attaining the specified outcomes. Such random variation could result from variations in climate and random effects of disturbance (such as, fire, insect activity, or wind).

The experts' judgment involved the way that a species would respond to these factors based on its life history characteristics. Life history characteristics include demographic characteristics, responses to varying qualities of habitat for specific life functions, types and ranges of seasonal and permanent movements, genetic characteristics, and biotic interactions (such as, competition, predation, and herbivory).

Analysis of the judgments—There were two primary analyses performed on the data derived from the expert panels. First, we calculated the mean likelihood scores for all experts for each of the outcomes. For example, if there were four experts on a panel, and their likelihood votes for Outcome 2, for a particular species were: 30, 30, 60, and 40, then the mean likelihood score would be 40. These mean likelihood scores were calculated for each of the judgments described above, and tables displaying these species means are included in the "Results" sections of this chapter.

To summarize mean likelihoods for each species, we also calculated a weighted mean outcome. This was calculated by assigning a value to each of the outcome categories (Outcome 1, value = 1; Outcome 2, value = 2; etc.), multiplying the mean likelihood of that outcome by its assigned value, adding these products for all outcomes, and then dividing by 100. The resulting weighted mean can be compared across time periods and across alternatives.

To display the weighted mean outcomes for groups of species, we developed simplified displays of the number of species that fell into each of five classes. These weighted mean outcome classes are used on many of the figures that accompany the text in this document.[6] The five classes are:

Outcome 1 includes weighted means from 1.00 to < 1.50

Outcome 2 includes weighted means from 1.50 to < 2.50

Outcome 3 includes weighted means from 2.50 to < 3.50

Outcome 4 includes weighted means from 3.50 to < 4.50

Outcome 5 includes weighted means from 4.50 to 5.00.

[6]The number of species that fell into each of these classes was determined from unrounded data. Data was rounded to the nearest tenth in the accompanying tables, and so can not be used to exactly replicate the outcome class information shown in the figures.

We also developed figures showing numbers of species for which outcomes improved, stayed the same, or declined under each of the alternatives, compared to the current outcomes. For these figures, species were only tallied as improving or declining if their weighted mean outcome changed by a value of at least 0.5, a value generally corresponding to one standard deviation of the mean outcome.

We assessed uncertainty around the weighted mean outcome scores by calculating the standard deviation (S.D.) of the distribution of likelihood points among the outcome classes for each species and each alternative:

$$S.D. = [\{\sum f_i x_i^2 - [(\sum f_i x_i)^2/n]\}/(n - 1)]^{-1/2}$$

where, f_i = likelihood in Outcome i,
i = 1, 2, 3, 4, or 5;
x_i = numerical outcome i ;
n = 100 (likelihood points).

Uncertainty of the results includes two components, variation of likelihood distributions among panelists and spread of likelihood points among outcomes by each panelist. Uncertainty would be low if panelists provided similar ratings, and if likelihoods were assigned to one outcome. We considered one standard deviation as a good measure of uncertainty in outcome scores. Assuming an approximately normal distribution of mean outcome scores, a range defined by mean outcome plus or minus one standard deviation would include about 68 percent of the expected distribution of scores. It should be recognized that the distribution of outcomes is on five discrete values, and therefore, is not continuous, and that standard deviations will be smaller when outcome likelihoods are distributed at the extremes of the distribution (that is, Outcomes 1 or 5).

We considered data gathered from the panels as input for the final results to be displayed in this chapter. When analyses had been completed, we reviewed them to insure that they reflected an adequate understanding of the alternatives and of the landscape being analyzed. Most of the final judgments reported here are identical to the results of the expert panels. However, there were a number of species (25) for which expert panel judgments proved to be inconsistent with projected habitat trends, or with the standards and guidelines of the alternatives. Such findings may have resulted from an unclear understanding of the management proposals, incomplete information on the effects of proposed management, or incomplete understanding of the species status within one or both EIS areas. In these situations, we provided final results different from the expert panels. The process of providing these final results involved a complete review of the data pertinent to the alternatives, a review of the panel notes and scores, a review of background literature on the species, consultation within the team, and, in some cases, consultation with additional species experts. These occurrences are footnoted in the results, discussed in the results for each species group, and displayed later in this chapter. Further documentation of the process of providing final results is on file with the ICBEMP.

The outcomes are projections of conditions for species and habitats at the specified points in time (historic, current, and 100 years in the future) under each alternative. In some cases, panelists chose to extend the period of the assessment beyond 100 years in order to fully account for the rate at which ecological processes would bring about changes in the landscape. Judgments were not made about trends in habitat or species' populations. Information about trends can be inferred through review of the judgments. The change from historic to current, and from current to future, under each alternative was determined by comparing the likelihoods or means of outcomes at each of those points in time.

Interpretation, Limitations, and Assumptions of the Analysis

Interpretation of results—This analysis does not provide a simple determination of what does and does not constitute a "viable" population. We consider this to be a strength of the process rather than a weakness. Previous experience has shown

that there are not simple thresholds for viability, particularly when assessments are done on a broad array of taxa. Rather than providing a simple determination, this analysis is intended to describe likely future conditions for species and habitats and to provide for comparison of those conditions to current and historic conditions.

Lack of a simple determination, however, adds complexity to the job of interpreting the results and using them in a decision-making framework. We recommend that interpretation of the results emphasizes a comparison of the projected future conditions under the alternatives to the historic and current conditions. Projected future conditions that produce outcomes similar to historic conditions should generally be considered as favorable. Similarly, projected future conditions that result in improvements from current conditions should be considered favorable, especially where current conditions are below historic conditions. Projected future conditions that result in declines from current conditions may be viewed as unfavorable, particularly if they indicate a significant increase in the likelihood that local populations will be isolated. For example, a change in weighted mean outcome from 3 to 4 should be considered a significant decrease. Any projected change that would result in a strong likelihood of species extirpation from a large portion of its range should be viewed as a serious concern. A change to a weighted mean outcome of 5 would indicate such a change. Changes in outcomes on Federal lands may weigh most heavily in consideration of the preliminary draft EIS alternatives. However, changes in cumulative effects should also be considered, particularly where there are opportunities for Federal lands to compensate for some level of the cumulative effect.

Uncertainty—Interpretation of results throughout this report must include a consideration of uncertainty. One measure of this uncertainty is indexed by the standard deviation of the frequency distribution of likelihoods among the outcome classes for each species. Based on analyses presented in detail in the "Summary" section of this chapter, we believe that variations of about plus or minus 0.5 weighted mean outcome units are most meaningful in comparisons of outcomes among single-species scenarios. Changes less than 0.5 are well within expected variation given the uncertainty in the outcome scores. For comparisons of mean outcomes computed from sets of species (such as amphibians or forest birds) much smaller differences may be meaningful and warrant consideration.

Limitations of the analysis—A variety of cautions must be applied to the interpretation of this analysis. These cautions fall into four areas: (1) broad geographic and time scale of the analysis, (2) resolution of the data and planning guidance, (3) limitations on ability to infer population results from habitat analysis, and (4) gaps in knowledge. These are briefly discussed below.

The scope of this analysis covers the entire ICBEMP assessment area. Habitat projections used in the analysis represent the summarized conditions found within species ranges in each of the EIS areas. For some species, it is possible, and even likely, that conditions within some smaller areas will be much better than the composite, and in others they will be much worse. This could have negative effects on species distribution that could not be predicted from the data reviewed here. Similarly, in making future projections we looked only at vegetation conditions at 10, 50, and 100 years, and did not review intermediate time periods. It is possible that conditions during intermediate times could be much worse, thus influencing the pattern of persistence of populations. This is most likely to happen in alternatives where aggressive actions are proposed over the short term, to begin returning systems to historic conditions.

The second caution relates to the resolution of data and the resolution of planning guidance. Habitat data reviewed for this assessment were broad in scope and represented only the macrohabitats with which each species is associated. Habitats that are distributed at finer scales (such as, riparian habitats) or are within stand microhabitat features (such as, snags and logs) were not

well represented by these data. As a consequence, assessment was difficult for species for which such habitats and features are important. Resolution of the planning guidance (that is, standards and guidelines, and prescriptions) given under each of the alternatives also limited the reliability of the analysis. In many areas, the planning guidance did not contain detailed prescriptions for management actions, or detailed information on how management actions and habitats would be distributed geographically across the landscape. As a consequence, much of this analysis had to be based on the intent of the alternatives, rather than on specific provisions. If one of these alternatives is implemented, additional analyses and guidance will be needed to design management actions that are consistent with the intent of the alternative and that would achieve the outcomes projected here.

The third caution relates to our ability to infer population consequences from habitat assessments. This caution is particularly strong for species whose populations are small and/or poorly distributed across the landscape. Conclusions on trends of habitats, particularly when extended to inferring potential effects on species, must be treated as tentative working hypotheses. The lack of specific data on population size, structure, and functional and numerical responses, requires that much inference has to be made from changes in habitat abundance and gross distribution patterns. Actual population response might differ.

The final caution relates to gaps in knowledge. Many of the species assessed here are poorly studied and inadequately understood. Their distribution, habitat associations, biotic interactions, and demographic statuses and characteristics are not well known. Likewise, successional dynamics and system interactions are incompletely understood for many vegetation types, and natural, large-scale disturbances cannot be accurately predicted. Projection reliability is reduced by these gaps in knowledge.

Assumptions used in analysis—As explained in the preceding "Limitations of analysis" section, many facets of the preliminary draft EIS alternatives were either not clear, or not explicit at the time that this analysis was conducted. In some situations, the Science Integration Team (SIT) had to make reasonable assumptions about the intent of the proposals. The following are the major assumptions used for the terrestrial species analysis:

1) Activities scheduled for the first 10 years of plan implementation would result in trends toward the desired future condition. This is especially important for roads under alternatives that call for both accelerated management activity and a reduction in road density.

2) Snag standards (both default and locally developed) will address snag number, diameter, height, decay class, species, distribution and replacement through time. Standards will be patterned after historic conditions for vegetation communities, but will include consideration of animal species' needs and current conditions (for example, landscapes that are currently deficient in snags, or that currently contain an abundance of snags). Standards will clearly specify how snags are to be treated under all types of prescriptions (such as, harvest, thinning, salvage, prescribed fire, etc.).

3) Down wood standards will address number and size (diameter and length) of pieces, species, distribution, and replacement through time. Standards will be patterned after historic conditions for vegetative communities, but will include consideration of animal species' needs and current conditions (for example, landscapes that are currently deficient in logs or that currently contain abundant logs). Standards will clearly specify how logs are to be treated under all types of prescriptions (such as, harvest, thinning, salvage, prescribed fire, etc.).

4) Consideration of plant and animal species will be a key component of the ecosystem analysis process used to implement the selected alternative. Habitat needs of species will be used to

help shape specific prescriptions and the scheduling and location of activities. Such considerations will be part of all prescriptions, including those designed to accomplish restoration objectives. A key consideration of ecosystem analysis will be projected changes in the availability of specific habitats through time. Actions that could reduce currently scarce or poorly distributed habitats will be carefully analyzed to insure that they will still allow species objectives to be met.

5) Appropriate vegetation patterning should be a key objective of restoration activities. Historic patterns of vegetative fragmentation and areas in juxtaposition will be used to establish stand and landscape objectives for vegetative restoration. Such considerations are particularly important where historic forest conditions included a fine-scale mix of different forest seral stages and tree densities, including small openings.

6) Restoration activities will be directed at all vegetation types, with priorities based on ecosystem analysis. Specific restoration activities should include aspen regeneration, cottonwood and willow regeneration and planting, and regeneration of all shrub species that were historically associated with upland and riparian shrub types, including juniper woodlands.

7) Restoration activities that are well studied and well understood will be pursued as aggressively under Alternative 6 as they are under Alternative 4.

8) Plant conservation strategies that have been approved will be applied in any alternative.

9) Standards will be applied in all alternatives to protect caves, cliffs, mines, and other bat roost sites and hibernacula.

Selection of Species for Analysis

The assessments described in this chapter were made for species for which some regional conservation concern existed or might exist in the future under any of the preliminary draft EIS alternatives. This focus was necessary due to time constraints. The criteria used to select species for assessment were:

1) Habitat for the species has declined historically or might decline in the future under any of the alternatives.

or

2) The species is associated with a specific habitat feature (such as, snags) that has declined in the past or might decline under any of the management alternatives.

or

3) The species' population has undergone a significant decline based either on data or on expert opinion.

and

4) The species is sufficiently widespread within the study area that it can be legitimately assessed at the scale of a regional plan.

Species were assessed if any of the first three criteria were true and Criterion 4 was true. The specific process used to select species within major taxonomic groups is discussed in subsequent sections. In these discussions, a clarification is needed on the status of species termed as "candidates" under the Endangered Species Act of 1973. Recent changes (Federal Register, February 28, 1996) have been made to the list of plant and animal species that are regarded as candidates (U.S. Government 1996). These changes dropped the classifications of Category 1 (C1), Category 2 (C2), and Category 3 (C3) candidates in favor of simply listing species as candidates for listing. Most of the species that were classified as Category 2 or 3 candidates, and 303 taxa that were Category 1 candidates are no longer included in the list of candidate species. A number of species discussed in this assessment are termed Category 2 because that was their status when our database was assembled. Of those species only two, mountain plovers and spotted frogs, were designated as can-

didates in the Federal Register notice. All others were dropped from the list of candidates. These changes are mentioned here only to clarify legal status. Change in status had no influence on our assessment process.

Non-vascular plants and allies—No regional viability analyses were done for non-vascular plants or allies (bryophytes, fungi, or lichens) under the preliminary draft EIS alternatives, and it is recommended that taxa in these species groups be considered for further analyses at finer geographic scales. The regional scale of the preliminary draft EIS alternatives, combined with a lack of detailed knowledge on the distribution of numerous non-vascular plants and allies, makes viability analysis problematic. Furthermore, the general nature of the alternatives and the standards and guidelines make it inappropriate to judge the fine-scale, site-specific effects of the alternatives on the taxa in these species groups.

There are no non-vascular plants or allies in the assessment area that are federally listed as endangered or threatened. Similarly, no non-vascular plants or allies in the assessment area are currently designated by the U.S. Fish and Wildlife Service (USFWS) as candidates for federal listing, although one lichen species, *Texosporium sancti-jacobi*, was formerly designated as a Category 2 candidate. This lichen is also the only non-vascular plant in the Basin that is designated as sensitive by the FS and the BLM. Contract reports specific to bryophytes (Christy and Harpel 1995), fungi (Castellano 1994, Fogel 1994, Miller 1994, Miller and Miller 1994, Weber 1994) and lichens (Eversman 1994, Hammer 1995, Kaltenecker and Wicklow-Howard 1994, McCune 1994, Rosentreter 1995, Ryan 1994, Wicklow-Howard 1994, Wicklow-Howard and Kaltenecker 1994) summarize the status of these species groups, and potentially rare taxa are discussed in each.

Vascular plants—During the compilation of information on vascular plants for the ICBEMP in 1994 and 1995, 164 plant taxa of rangewide conservation concern were evaluated with respect to their vegetation cover type associations, natural and human-caused threats to populations, and ecological characteristics (appendix 4-B). Each of these taxa was also categorized into one of five geographic distribution categories based on the nature of its distribution pattern within the Basin; these are defined as follows:

Local endemic (80 taxa): populations are restricted to a very small geographic area (such as, a single mountain range, a localized set of bedrock outcrops, etc.). These taxa are often also confined to highly specialized habitats.

Regional endemic (66 taxa): populations inhabit a larger geographic area than do local endemics (such as, southeast Washington and adjacent Idaho for certain Palouse endemics). These taxa may also be closely associated with certain habitats, but many of them are not ecologically specialized.

Scattered distribution (14 taxa): populations are sparsely distributed over a wide geographic area within the Basin. Their ranges often extend outside the Basin, but nowhere are they common elements on the landscape.

Disjunct (3 taxa): populations within the Basin are substantially separated geographically from the remainder of the taxon's range.

Peripheral (1 taxon): populations within the Basin lie on the margin of the taxon's range, but are geographically contiguous with that range.

The majority of these 164 vascular plant taxa are either locally endemic in their distribution pattern, or have broader distributions that are associated with highly specialized habitats. Outcomes for such taxa could not be appropriately analyzed at the broad scale of our evaluation, owing to the general nature of the alternatives and associated prescriptions. The viability and conservation of these narrowly distributed or ecologically restricted taxa are best addressed at the local or subregional level, that is, on the pertinent National Forest(s) or BLM unit(s), or by Ecological Reporting Units (ERU). Appropriate approaches in these cases include the development of species

conservation strategies or the incorporation of specific standards and guidelines into the management plans for those planning areas.

Thirty-seven of the rare vascular plant taxa were selected for possible assessment. Some of these species have a broad geographic distribution pattern in the Basin (such as, species of scattered distribution that are not habitat specialists). Other species were included regardless of their distribution pattern because they occur in two or more of the broad community groups that were ultimately used to combine the original vegetation cover types (such as, local or regional endemics that are not highly specialized with respect to habitat requirements). These taxa could appropriately be addressed across larger landscape areas, and with respect to the general alternatives proposed in the preliminary draft EISs. Exceptions to this approach included the assessment of three federally listed species. They were evaluated even though their geographic distribution pattern or highly specialized ecological relationships would have otherwise precluded rating them at the broad scale. These federally listed taxa included: *Howellia aquatilis* (threatened), an ecologically highly specialized species of scattered distribution; *Mirabilis macfarlanei* (threatened), a local endemic; and *Stephanomeria malheurensis* (endangered), a local endemic.

During the assessment process, 9 of the 37 taxa were dropped from further consideration for the reasons discussed below:

Antennaria arcuate has a scattered distribution, but only one occurrence in the Basin; species is not appropriately analyzed at the regional scale.

Aster mollis has a scattered distribution, but only one occurrence in the Basin; species is not appropriately analyzed at the regional scale.

Aster jessicae has no occurrences on BLM- or FS-administered lands.

Astragalus applegatei is federally listed as endangered, and is probably the most imperiled plant in Oregon, but, it has no occurrences on BLM- or FS-administered lands.

Lesquerella carinata var. carinata has no occurrences on BLM- or FS-administered lands in the Basin assessment area.

Lesquerella pulchella has no occurrences within the Basin.

Lupinus biddlei is no longer of rangewide conservation concern.

Mimulus patulus has specialized habitat requirements; species is not appropriately analyzed at the assessment scale.

Oryzopsis contracta is no longer of rangewide conservation concern.

Thus, 28 plant taxa of rangewide conservation concern that could appropriately be analyzed at the broad scale of the assessment were ultimately selected for outcome analysis. The remaining 127 taxa, including numerous more highly imperiled endemic or ecologically specialized plants, could not be meaningfully analyzed at this broad scale. These include many globally rare plant taxa designated as sensitive by either the Forest Service or the BLM. Appendix 4-B lists all 164 plant taxa and indicates those that were analyzed in this evaluation, those that were recommended for analysis at finer scale, and those that were dropped from consideration because they are not of conservation concern.

Detailed information on all taxa in five large vascular plant genera in the Basin is available in separate contract reports. These genera include Allium (McNeal 1995), *Botrychium* (Zika 1995), Carex (Brainerd and others 1995), *Mimulus* (Meinke 1995a) and *Penstemon* (Meinke 1995b). These reports provide detailed data on the biogeography, ecological relationships and status of both rare and common taxa in these genera.

The taxonomic status of one of the federally listed plant taxa, *Stephanomeria malheurensis*, has recently been changed in the literature. It is most currently treated as a synonym of a more common, wide-ranging species, *S. exigua* (Cronquist 1994). This taxonomic change may have a

bearing on the federal listing of the former taxon, but until the USFWS formally recognizes this change, the species will be addressed in the ICBEMP assessment as a federally listed taxon.

Invertebrates—No regional viability analysis was done for invertebrate species under the alternatives for the Basin assessment, and it is recommended that invertebrates be considered for analysis at finer scales. The regional scale of the EIS alternatives combined with a basic lack of knowledge of invertebrate species' distributions and habitat use makes viability analysis problematic. Moreover, the general nature of the alternatives and the standards and guidelines would make it inappropriate to judge the fine-scale, site-specific effects of the alternatives on invertebrates.

There are no terrestrial invertebrates that are federally listed as endangered or threatened in the assessment area. No terrestrial invertebrates are listed as Federal C1 Candidate species, although 19 terrestrial species are listed as Federal C2 Candidate species (table 4.1). The Forest Service does not list any terrestrial invertebrates in their regional sensitive species lists. BLM regional offices list six sensitive invertebrate species (table 4.1). Experts have identified additional unlisted species as rare or endemic in the assessment area. These species are listed and discussed in the Terrestrial Ecology chapter of the *Assessment of Ecosystem Components* (Marcot and others, in press), and in ICBEMP detailed contract reports.[7]

Vertebrates—The Species-Environment Relations (SER) database developed for the Basin analysis lists 548 vertebrate species that occur within the assessment area during some part of their life history. We followed a step-wise process to determine which of these should be analyzed in this evaluation. The selection process used information gathered in the SER database (species range, status, and habitat relationships), and the results of a preliminary evaluation of habitat and population changes for all species both historically and under the preliminary alternatives done in October and November 1995.[8]

We initially placed species in four groups: group 1 included species for which analysis should be conducted at finer scale; group 2 included species whose outcomes appear secure and for which analysis was not deemed necessary; group 3 included species for which analysis was clearly appropriate; and, group 4 included species which did not fall in any of the other three categories. We then examined species in the fourth group individually. Appendix 4-C displays the judgments made about analysis of each of the vertebrate species contained in the SER database.

The first group consisted of species that are locally endemic within the Basin and for which analysis at finer scales was considered most appropriate. Locally endemic populations restricted to a very small area (for example, one portion of a mountain range, or canyon) may also be restricted to very specialized habitats and have distributions entirely within the Basin evaluation area.

The second group, species for which no further analysis was considered necessary, included widely distributed species that are common or abundant, have had no recorded population or habitat declines during the historical period, and are not expected to experience habitat declines under the preliminary draft EIS alternatives (preliminary analysis of alternatives[9]). These widespread and abundant species are typically habitat generalists and are considered unlikely to be affected by federal land management alternatives on a regional scale.

[7]Contract reports, on file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

[8]On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

[9]Preliminary Draft EIS alternatives, on file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

Table 4.1. U.S. Fish and Wildlife Service Federal Category 2 Candidate and BLM sensitive invertebrate species.

Class/Order	Genus & Species	USFWS C2	BLM Sensitive
Arachnida, Pseudoscorpionida			
Gastropoda	*Apochtonius malheuri*	C[1]	
	Acroloxus coloradensis	C	
	Cryptomastix magnidentata	C	
	Discus marmorensis	C	
	Megomphix lutarius		C
	Monadenia felis minor	C	C
	Oreohelix idahoensis idahoensis	C	
	Oreohelix jugalis	C	
	Oreohelix nevadensis	C	
	Oreohelix strigosa delicata		C
	Oreohelix strigosa honiogyra	C	
	Oreohelix vortex	C	
	Oreohelix waltoni	C	
Insecta, Coleoptera	*Agonum belleri*	C	
	Cicindela arenicola	C	
	Glacicavicola bathyscoides	C	
	Nebria gebleri fragariae		C
	Nebria vandykei wyeast		C
Insecta, Lepidoptera	*Charidryas acastus dorothyea*		C
	Euphilotes rita mattonii	C	
	Limenitis archippus lahontani	C	
	Polites sabuleti sinemaculata	C	
	Polites mardon	C	
Insecta, Orthopera	*Acrolophitus pulchellus*	C	

[1]C = currently listed

In addition, no analysis was considered necessary for bird species that are irregular visitors within the Basin and do not depend on habitats within the evaluation area for key life functions. Federal habitat management within the Basin was considered to have little effect on viability of these species.

The third group, species for which analysis was considered mandatory, included federally listed or candidate species, or species that have been the subject of lawsuits. Species listed as sensitive by the Forest Service or BLM were also designated for analysis unless deemed most suitable for fine-scale analysis or considered to be little affected by Federal habitat management.

Species that did not fall in any of the first three groups were examined individually to determine if there were sufficient concerns about their outcomes in the Basin to warrant detailed analysis. Information used in this assessment included published reports, the SER database, the initial evaluation of alternatives conducted in 1995, and any existing data on population trends. Species were generally selected for analysis if they were known or expected to have experienced significant habitat or population declines in the past, or were associated with habitats expected to decline under one or more alternatives. Species were generally not selected for analysis if they were common, abundant, or associated with habitats considered to be secure. Some species whose ranges are predominantly outside the Columbia River Basin were

not further analyzed because actions within the Basin were considered of little consequence to their viability. These species were generally placed in the category of those requiring finer-scale assessments.[10]

No special consideration was given to socially or economically important species (such as, big game mammals and game birds), or to tribal-emphasis species that were not selected for the previously mentioned ecological reasons. In many cases, such species are widespread and relatively common or abundant, and there is little concern for their viability within the Basin. Issues of harvestability were outside the scope of our outcome analysis and would require a different evaluation process.

Table 4.2 shows the number of vertebrate species in each class that were deemed appropriate for regional or fine-scale analysis and for no further analysis. There were 173 vertebrate species selected for analysis in this evaluation. Species not selected for viability analysis numbered 335. Forty species were recommended for analysis in finer-scale planning processes.

Effects of Options on Terrestrial Species

Vascular Plants

Introduction—The 28 vascular plants that were selected for analysis include 19 regionally endemic species, 4 locally endemic species, and 5 species with scattered distributions. Twenty-five of these taxa were selected because of rangewide conservation concerns, and because they could be reasonably analyzed on a broad scale with respect to the general nature of the alternatives, as discussed in the methods section immediately below. The remaining three taxa were selected because they are federally listed.

Four of the regional endemics (*Astragalus mulfordiae, A. oniciformis, A. solitarius, A. yoder-williamsii*) were selected because they occur in upland shrub habitats, especially *Artemisia* (sagebrush) shrublands, and are known either to have suffered population declines or are expected to decline under some of the draft alternatives. Four regional endemics (*Calochortus nitidus, Haplopappus liatriformis, Polemonium pectinatum, Silene spaldingii*) are associated with the Palouse grasslands, and are also known to have suffered severe population losses throughout all or a significant portion of their historic range as these grasslands were largely

Table 4.2. Tally of vertebrate species showing those selected for detailed analysis; those for which analysis at finer scale is most appropriate; and, those for which detailed analysis was not considered necessary.

	Analysis			
Vertebrate Class	EIS	Fine	No Analysis	Grand Total
Amphibians	7	3	17	27
Birds	133	9	220	362
Mammals	20	25	87	132
Reptiles	13	3	11	27
Grand Total	173	40	335	548

[10]Narratives describing the reasons for selection or rejection of species for analysis (ones not initially categorized by the rule sets) are on file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

converted for agricultural use. The remaining 11 regional endemics (*Astragalus paysonii, Calochortus longebarbatus* var. *longebarbatus, Castilleja chlorotica, Collomia mazama, Grindelia howellii, Hackelia cronquistii, Lomatium suksdorfii, Mimulus pygmaeus, Mimulus washingtonensis* var. *washingtonensis, Penstemon glaucinus, Penstemon lemhiensis*) were selected because they are associated with common vegetation types and could thus be appropriately analyzed with respect to the general nature of the alternatives and associated prescriptions.

Two of the local endemics, (*Mirabilis macfarlanei, Stephanomeria malheurensis*) which otherwise would not have been analyzed because of their limited geographic ranges, were selected because they are federally listed. The other two local endemics (*Calochortus longebarbatus* var. *peckii, Trifolium thompsonii*) were selected, despite their restricted geographic ranges, because they occur in common community types that could potentially be affected by implementation of one or more of the alternatives.

One of the taxa (*Howellia aquatilis*) with a scattered distribution, would normally not have been analyzed because it is only found in a highly specialized habitat; however, it was selected because it is federally listed. The other four scattered taxa (*Botrychium ascendens, B. crenulatum, B. paradoxum, Cypripedium fasciculatum*) were selected because of their rangewide rarity, and because they occurred in common community types that could potentially be affected by implementation of one or more of the general alternatives.

Methods—The assessment panel consisted of three members of the Science Integration Team (appendix 4-A). Adequate information on the status and viability of the 28 taxa being assessed had been compiled during the extensive expert panels held in 1994 and 1995. This information was usually sufficient to assign ratings without having to convene an additional, larger panel. The earlier panels involved numerous botanists from all physiographic provinces in the Basin. During this evaluation, many of these experts were again consulted as questions arose regarding land ownership, or the ecological relationships of these taxa.

Methods used for vascular plant analysis were those described above in "Methods for Assessing Effects on Terrestrial Species." Population distribution data, available from the state-level network of Natural Heritage Programs and Conservation Data Centers, were used to create distribution maps. Spatial layers depicting management prescriptions for each EIS alternative were superimposed over the occurrence distribution maps of the plant taxa. For each species, tallies of the number of occurrences (by prescription and alternative) were then made in order to assess likely outcomes for each species under each alternative. In addition, vegetation community group changes (as predicted for the historical and current conditions, and for 100-year outcomes for each of the seven EIS alternatives) were taken into consideration in assessing species outcomes.

Because of their intrinsic geographic distributions, some of the five habitat and population outcomes used for this evaluation are not applicable to the rare vascular plants. Outcome 3 was found to be the most favorable outcome for most of the rare vascular plants. This was based on their evolutionary history and intrinsically patchy or limited distribution patterns (both ecologically and spatially) on the landscape. Outcome 1 was never found to apply to these rare vascular plant taxa, and Outcome 2 was thought to apply only for one species (*Cypripedium fasciculatum*) where the associated community types and broad distribution pattern of the populations suggested that a larger, contiguous set of habitats and populations could occur on the landscape.

In assigning outcomes to plant species on both Federal lands (FS and BLM) and for all ownerships (cumulative effects), habitat and population trends were considered only within the ranges of these rare plant taxa (as opposed to including suitable but unoccupied habitat that might occur outside these ranges, across a broader portion of the EIS areas). This is again related to the intrinsically restricted geographic ranges of most of these taxa.

Their evolutionary history and past climatic and geological influences have played a larger role in determining their distributions than has the presence of suitable habitat.

In assigning outcomes for certain species, it was assumed that conservation agreements that have been adopted by the Federal agencies would be implemented under all alternatives. These strategies would apply to populations and habitat on Federal lands only. Conservation agreements have been adopted for seven of the plant species analyzed here: *Astragalus mulfordiae, Calochortus longebarbatus* var. *longebarbatus, Castilleja chlorotica, Howellia aquatilis, Mimulus pygmaeus, Penstemon glaucinus, and Stephanomeria malheurensis.* In addition, it was assumed that appropriate National Environmental Protection Act (NEPA) analysis and mitigation would continue, for all species of conservation concern, during project analysis and implementation under all of the alternatives.

Results—Twenty-two of the vascular plant taxa analyzed occur on Forest Service- or BLM-administered lands in the EEIS area, and 15 of them occur on Federal lands in the UCRB EIS area. The number of these taxa in each outcome class, for historic and current conditions, and for each alternative after 100 years, is summarized for each EIS area in figure 4.1. Most taxa are in Outcome classes 3 and 4 for historic and current conditions, as well as for the expected outcomes for all alternatives.

Mean outcomes for each of the species are shown in table 4.3. The weighted mean outcomes, for both Federal lands and for the cumulative effects analysis, are summarized in table 4.4 and figure 4.2. The general trend for the 28 vascular plants

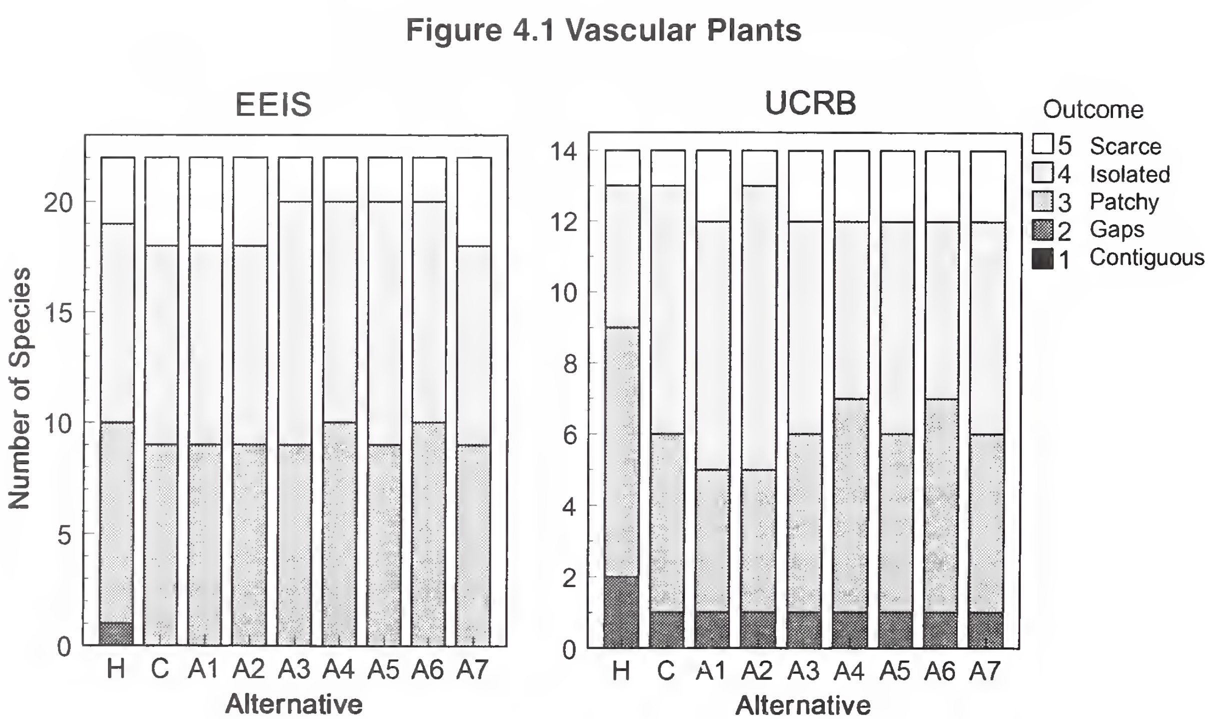

Figure 4.1. Frequency distribution of mean habitat outcome scores for 22 taxa of vascular plants in the EEIS planning area, and 14 taxa in the UCRB planning area, on Federal lands for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.2 Vascular Plants

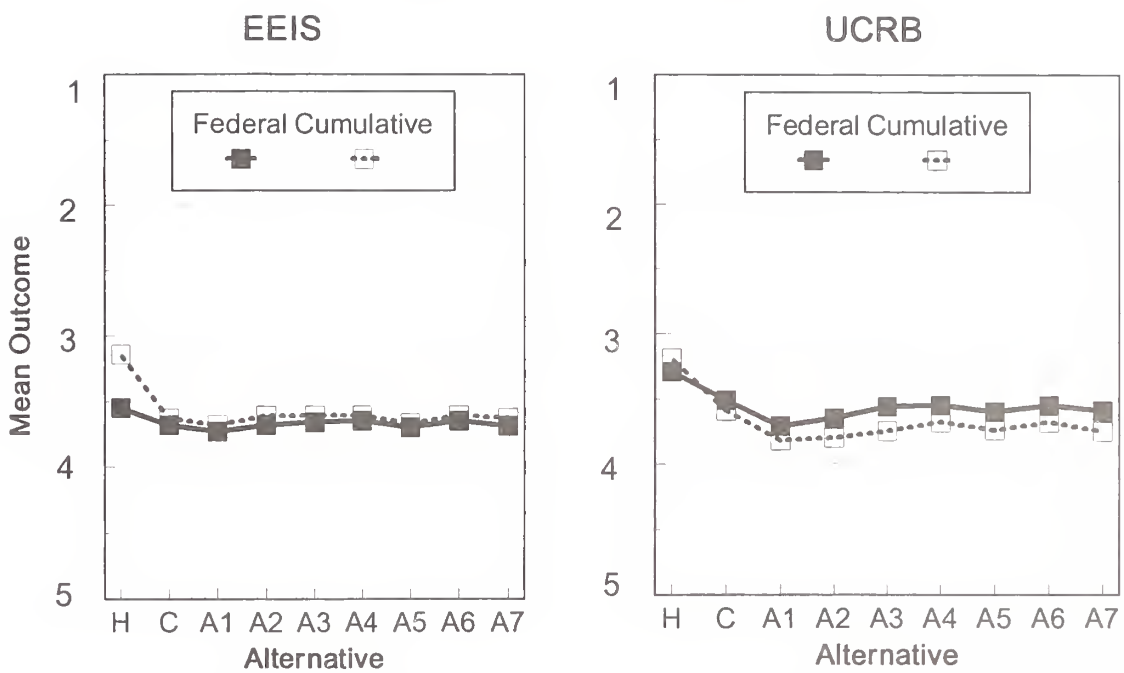

Figure 4.2. Mean outcome scores averaged over 28 vascular plant taxa in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

that were analyzed, on both Federal land and all ownerships, has been a decline in habitat and population integrity from the historical condition to the present. With respect to future conditions under all alternatives, however, the habitat and population integrity of these taxa is predicted to remain relatively unchanged at these reduced levels, but with some modest improvement predicted under Alternatives 2, 4, and 6.

The weighted mean outcomes are presented for seven individual plant taxa in figures 4.3 through 4.9. The specific outcomes for these are included because they exemplify general ecological and response characteristics of the vascular plants analyzed. These are discussed below.

Discussion—The declines from historic to current conditions for the 28 rare vascular plant taxa analyzed have generally resulted from habitat conversion or shifts in habitat suitability. Altered habitats are the result of successional changes, which can be attributed to fire suppression and other land management activities (such as, grazing, timber harvest). Projected change under the alternatives is expected to be smaller for plants than for animals, owing to the intrinsically patchy distributions and slower, more stochastic nature of dispersal that is typical of plants. Implementation of the ecosystem restoration approaches emphasized in Alternatives 4 and 6 is expected to provide more suitable conditions for these taxa over the next 100 years (fig. 4.1), but differences among alternatives for all plant species combined are slight (fig. 4.2).

Table 4.3. Mean likelihood scores of viability outcomes for selected species of vascular plants for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means are calculated from the individual likelihood scores of panelists.

			Period / Alternative[3]								
Species Name	Area[1]	Outcome[2]	H	C	A1	A2	A3	A4	A5	A6	A7
Astragalus mulfordiae	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	60	30	50	50	65	50	65	50
		4	20	40	60	40	40	25	40	25	40
		5	0	0	10	10	10	10	10	10	10
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	70	30	50	50	60	40	60	50
		4	20	20	60	40	40	30	40	30	40
		5	0	10	10	10	10	10	20	10	10
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	70	30	50	50	65	50	65	50
		4	20	30	60	40	40	25	40	25	40
		5	0	0	10	10	10	10	10	10	10
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	60	20	40	40	55	40	55	40
		4	20	40	60	40	40	30	40	30	40
		5	0	0	20	20	20	15	20	15	20
Astragalus oniciformis	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	60	40	40	55	60	55	60	70
		4	10	40	40	40	40	30	40	30	20
		5	0	0	20	20	5	10	5	10	10
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	60	50	50	60	60	60	60	50
		4	10	40	45	45	30	30	30	30	40
		5	0	0	5	5	10	10	10	10	10
Astragalus paysonii	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	70	70	60	85	90	85	90	85
		4	20	30	30	40	15	10	15	10	15
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	70	70	60	85	90	85	90	85
		4	20	30	30	40	15	10	15	10	15
		5	0	0	0	0	0	0	0	0	0
Astragalus solitarius	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	70	70	70	70	80	70	80	70
		4	20	30	30	30	30	20	30	20	30
		5	0	0	0	0	0	0	0	0	0

Table 4.3 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3]								
			H	C	A1	A2	A3	A4	A5	A6	A7
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	70	70	70	70	80	70	80	70
		4	20	30	30	30	30	20	30	20	30
		5	0	0	0	0	0	0	0	0	0
Astragalus yoder-williamsii	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	70	80	70	70	90	80	90	80
		4	10	20	10	20	20	5	10	5	10
		5	0	10	10	10	10	5	10	5	10
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	70	80	70	70	90	80	90	80
		4	10	20	10	20	20	5	10	5	10
		5	0	10	10	10	10	5	10	5	10
Botrychium ascendens	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	80	80	70	70	70	70	80
		4	50	50	20	20	30	30	30	30	20
		5	0	0	0	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	0	0	0	0	0	0	0
		4	50	50	40	60	30	40	30	40	30
		5	0	0	60	40	70	60	70	60	70
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	0	0	0	0	0	0	0
		4	50	50	40	40	40	40	40	40	40
		5	0	0	60	60	60	60	60	60	60
Botrychium crenulatum	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	30	60	60	40	20	40	60
		4	50	50	30	30	30	40	40	40	30
		5	0	0	40	10	10	20	40	20	10
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	30	60	60	40	20	40	60
		4	50	50	30	30	30	40	40	40	30
		5	0	0	40	10	10	20	40	20	10
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	40	40	10	40	40	20	10	20	40
		4	60	60	40	40	40	40	40	40	40
		5	0	0	50	20	20	40	50	40	20
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	40	40	0	0	0	0	0	0	0
		4	60	60	40	40	40	40	40	40	40
		5	0	0	60	60	60	60	60	60	60

Table 4.3 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3]								
			H	C	A1	A2	A3	A4	A5	A6	A7
Botrychium paradoxum	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	40	40	40	40	40	40	40
		4	50	50	60	60	60	60	60	60	60
		5	0	0	0	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	40	40	40	40	40	40	40
		4	50	50	60	60	60	60	60	60	60
		5	0	0	0	0	0	0	0	0	0
Calochortus longebarbatus var. *longebarbatus*	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	70	55	65	65	60	55	60	65
		4	20	30	45	35	35	40	45	40	35
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	65	50	60	60	55	50	55	60
		4	20	35	50	40	40	45	50	45	40
		5	0	0	0	0	0	0	0	0	0
Calochortus longebarbatus var. *peckii*	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	100	80	80	90	90	80	70	80	90
		4	0	20	20	10	10	20	30	20	10
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	100	75	80	90	90	80	70	80	90
		4	0	25	20	10	10	20	30	20	10
		5	0	0	0	0	0	0	0	0	0
Calochortus nitidus	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	60	30	30	30	50	50	50	50	20
		4	40	70	70	70	50	50	50	50	80
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	60	25	25	25	45	45	45	45	20
		4	40	75	75	75	55	55	55	55	80
		5	0	0	0	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	10	10	20	10	25	25	25	25	20
		4	90	90	80	90	75	75	75	75	80
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	70	10	5	5	5	5	5	5	0
		4	30	30	20	20	20	20	20	20	10
		5	0	60	75	75	75	75	75	75	90

Table 4.3 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
Castilleja chlorotica	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	80	90	90	90	90	90	90	70
		4	10	20	10	10	10	10	10	10	30
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	80	90	90	90	90	90	90	65
		4	10	20	10	10	10	10	10	10	35
		5	0	0	0	0	0	0	0	0	0
Collomia mazama	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	90	90	90	80	90	80	90	90
		4	10	10	10	10	20	10	20	10	10
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	90	90	90	80	90	80	90	90
		4	10	10	10	10	20	10	20	10	10
		5	0	0	0	0	0	0	0	0	0
Cypripedium fasciculatum	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	70	10	10	10	10	10	10	10	0
		3	30	60	60	60	80	80	80	80	70
		4	0	30	30	30	10	10	10	10	30
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	70	10	10	10	10	10	10	10	10
		3	30	60	60	60	70	70	70	70	70
		4	0	25	25	25	15	15	15	15	15
		5	0	5	5	5	5	5	5	5	5
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	70	80	70	70	85	90	85	90	80
		3	30	10	20	20	15	10	15	10	20
		4	0	10	10	10	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	60	70	70	80	70	90	65	90	85
		3	40	20	20	10	20	5	25	5	15
		4	0	10	10	10	10	5	10	5	0
		5	0	0	0	0	0	0	0	0	0
Grindelia howellii	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	50	60	75	80	70	80	70	70
		4	0	50	40	25	20	30	20	30	30
		5	100	0	0	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	60	85	85	85	85	85	85	85
		4	60	40	15	15	15	15	15	15	15
		5	40	0	0	0	0	0	0	0	0

Table 4.3 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3]								
			H	C	A1	A2	A3	A4	A5	A6	A7
Hackelia cronquistii	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	40	30	35	30	50	35	45	45
		4	50	60	60	60	65	45	60	45	45
		5	0	0	10	5	5	5	5	10	10
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	30	30	30	30	40	30	35	40
		4	50	70	70	70	70	60	70	65	60
		5	0	0	0	0	0	0	0	0	0
Haplopappus liatriformis	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	80	0	0	0	0	0	0	0	0
		3	20	0	0	0	0	0	0	0	0
		4	0	20	10	10	10	10	10	10	10
		5	0	80	90	90	90	90	90	90	90
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	80	0	0	0	0	0	0	0	0
		3	20	0	0	0	0	0	0	0	0
		4	0	15	10	10	10	10	10	10	10
		5	0	85	90	90	90	90	90	90	90
Howellia aquatilis	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	0	0	0	0	0
		4	80	75	75	75	75	75	75	75	75
		5	20	25	25	25	25	25	25	25	25
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	60	60	60	60	50	50	50	50	50
		4	40	20	20	20	30	30	30	30	30
		5	0	20	20	20	20	20	20	20	20
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	90	85	85	85	85	85	85	90
		4	10	5	10	10	10	10	10	10	5
		5	0	5	5	5	5	5	5	5	5
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	90	80	80	80	80	80	80	90
		4	10	5	10	10	10	10	10	10	5
		5	0	5	10	10	10	10	10	10	5
Lomatium suksdorfii	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	0	0	0	0	0
		4	50	50	50	50	50	50	50	50	50
		5	50	50	50	50	50	50	50	50	50
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	60	50	40	40	40	40	40	40	40
		4	40	50	60	60	60	60	60	60	60
		5	0	0	0	0	0	0	0	0	0

Table 4.3 (continued)

Species Name	Area[1]	Outcome[2]	H	C	A1	A2	A3	A4	A5	A6	A7
			Period / Alternative[3]								
Mimulus pygmaeus	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	80	80	85	80	85	80	85	80
		4	10	20	20	15	20	15	20	15	20
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	80	80	85	80	85	80	85	80
		4	10	20	20	15	20	15	20	15	20
		5	0	0	0	0	0	0	0	0	0
Mimulus washingtonensis var. *washingtonensis*	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	30	20	20	30	30	30	30	30	20
		4	70	80	80	70	70	70	70	70	80
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	30	20	20	30	30	30	30	30	20
		4	70	80	80	70	70	70	70	70	80
		5	0	0	0	0	0	0	0	0	0
Mirabilis macfarlanei	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	5	5	10	10	10	10	10	20
		4	10	90	90	80	80	80	80	80	70
		5	0	5	5	10	10	10	10	10	10
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	0	10	10	10	10	10	10	10
		4	10	50	50	60	60	60	60	60	70
		5	0	50	40	30	30	30	30	30	20
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	25	25	30	30	30	30	30	30
		4	10	70	70	65	65	65	65	65	70
		5	0	5	5	5	5	5	5	5	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	10	10	20	20	20	20	20	20
		4	10	80	80	70	70	70	70	70	70
		5	0	10	10	10	10	10	10	10	10
Penstemon glaucinus	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	40	70	80	80	80	80	80	80	75
		4	60	30	20	20	20	20	20	20	25
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	40	70	80	80	80	80	80	80	75
		4	60	30	20	20	20	20	20	20	25
		5	0	0	0	0	0	0	0	0	0

Table 4.3 (continued)

Species Name	Area[1]	Outcome[2]	H	C	A1	A2	A3	A4	A5	A6	A7
			Period / Alternative[3]								
Penstemon lemhiensis	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	70	40	40	40	80	90	80	90	40
		4	30	50	50	50	20	10	20	10	60
		5	0	10	10	10	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	70	30	30	30	70	80	70	80	40
		4	30	60	60	60	30	20	30	20	60
		5	0	10	10	10	0	0	0	0	0
Polemonium pectinatum	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	0	0	0	0	0
		4	60	50	50	50	55	55	55	55	50
		5	40	50	50	50	45	45	45	45	50
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	80	0	0	0	0	0	0	0	0
		3	20	0	0	0	0	0	0	0	0
		4	0	10	5	5	5	5	5	5	5
		5	0	90	95	95	95	95	95	95	95
Silene spaldingii	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	10	10	10	10	0
		4	50	50	50	50	50	50	50	50	50
		5	50	50	50	50	40	40	40	40	50
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	80	0	0	0	0	0	0	0	0
		3	20	0	0	0	0	0	0	0	0
		4	0	20	10	10	10	10	10	10	10
		5	0	80	90	90	90	90	90	90	90
Stephanomeria malheurensis	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	0	0	0	0	0
		4	0	0	0	0	0	0	0	0	0
		5	100	100	100	100	100	100	100	100	100
Trifolium thompsonii	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	40	40	45	50	45	50	45
		4	50	50	60	60	55	50	55	50	55
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	45	45	50	55	50	55	50
		4	50	50	55	55	50	45	50	45	50
		5	0	0	0	0	0	0	0	0	0

[1]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[2]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

Table 4.4. Mean viability outcomes for habitat and populations of vascular plants for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

		Period / Alternative[2]								
Name	Area[1]	H	C	A1	A2	A3	A4	A5	A6	A7
Astragalus mulfordiae	EEIS BLM/FS	3.2	3.4	3.8	3.6	3.6	3.5	3.6	3.5	3.6
	EEIS CumEff	3.2	3.4	3.8	3.6	3.6	3.5	3.8	3.5	3.6
	UCRB BLM/FS	3.2	3.3	3.8[3]	3.6	3.6	3.5	3.6	3.5	3.6
	UCRB CumEff	3.2	3.4	4.0[3]	3.8	3.8	3.6	3.8	3.6	3.8
Astragalus oniciformis	UCRB BLM/FS	3.1	3.4	3.8	3.8	3.5	3.5	3.5	3.5	3.4
	UCRB CumEff	3.1	3.4	3.6	3.6	3.5	3.5	3.5	3.5	3.6
Astragalus paysonii	UCRB BLM/FS	3.2	3.3	3.3	3.4	3.2	3.1	3.2	3.1	3.2
	UCRB CumEff	3.2	3.3	3.3	3.4	3.2	3.1	3.2	3.1	3.2
Astragalus solitarius	EEIS BLM/FS	3.2	3.3	3.3	3.3	3.3	3.2	3.3	3.2	3.3
	EEIS CumEff	3.2	3.3	3.3	3.3	3.3	3.2	3.3	3.2	3.3
Astragalus yoder-williamsii	UCRB BLM/FS	3.1	3.4	3.3	3.4	3.4	3.2	3.3	3.2	3.3
	UCRB CumEff	3.1	3.4	3.3	3.4	3.4	3.2	3.3	3.2	3.3
Botrychium ascendens	EEIS BLM/FS	3.5	3.5	3.2	3.2	3.3	3.3	3.3	3.3	3.2
	UCRB BLM/FS	3.5	3.5	4.6[3]	4.4[3]	4.7[3]	4.6[3]	4.7[3]	4.6[3]	4.7[3]
	UCRB CumEff	3.5	3.5	4.6[3]	4.6[3]	4.6[3]	4.6[3]	4.6[3]	4.6[3]	4.6[3]
Botrychium crenulatum	EEIS BLM/FS	3.5	3.5	4.1[3]	3.5	3.5	3.8	4.2[3]	3.8	3.5
	EEIS CumEff	3.5	3.5	4.1[3]	3.5	3.5	3.8	4.2[3]	3.8	3.5
	UCRB BLM/FS	3.6	3.6	4.4[3]	3.8	3.8	4.2[3]	4.4[3]	4.2[3]	3.8
	UCRB CumEff	3.6	3.6	4.6[3]	4.6[3]	4.6[3]	4.6[3]	4.6[3]	4.6[3]	4.6[3]
Botrychium paradoxum	EEIS BLM/FS	3.5	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	UCRB BLM/FS	3.5	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Calochortus longebarbatus var. *longebarbatus*	EEIS BLM/FS	3.2	3.3	3.5	3.4	3.4	3.4	3.5	3.4	3.4
	EEIS CumEff	3.2	3.4	3.5	3.4	3.4	3.5	3.5	3.5	3.4
Calochortus longebarbatus var. *peckii*	EEIS BLM/FS	3.0	3.2	3.2	3.1	3.1	3.2	3.3	3.2	3.1
	EEIS CumEff	3.0	3.3	3.2	3.1	3.1	3.2	3.3	3.2	3.1
Calochortus nitidus	EEIS BLM/FS	3.4	3.7	3.7	3.7	3.5	3.5	3.5	3.5	3.8
	EEIS CumEff	3.4	3.8	3.8	3.8	3.6	3.6	3.6	3.6	3.8
	UCRB BLM/FS	3.9	3.9	3.8	3.9	3.8	3.8	3.8	3.8	3.8
	UCRB CumEff	3.3	4.5	4.7	4.7	4.7	4.7	4.7	4.7	4.9
Castilleja chlorotica	EEIS BLM/FS	3.1	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.3
	EEIS CumEff	3.1	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.4
Collomia mazama	EEIS BLM/FS	3.1	3.1	3.1	3.1	3.2	3.1	3.2	3.1	3.1
	EEIS CumEff	3.1	3.1	3.1	3.1	3.2	3.1	3.2	3.1	3.1
Cypripedium fasciculatum	EEIS BLM/FS	2.3	3.2	3.2	3.2	3.0	3.0	3.0	3.0	3.3
	EEIS CumEff	2.3	3.3	3.3	3.3	3.2	3.2	3.2	3.2	3.2
	UCRB BLM/FS	2.3	2.3	2.4	2.4	2.2	2.1	2.2	2.1	2.2
	UCRB CumEff	2.4	2.4	2.4	2.3	2.4	2.2	2.5	2.2	2.2
Grindelia howellii	UCRB BLM/FS	5.0	3.5	3.4	3.3	3.2	3.3	3.2	3.3	3.3
	UCRB CumEff	4.4	3.4	3.2	3.2	3.2	3.2	3.2	3.2	3.2

Table 4.4 (continued)

Name	Area[1]	Period / Alternative[2] H	C	A1	A2	A3	A4	A5	A6	A7
Hackelia cronquistii	EEIS BLM/FS	3.5	3.6	3.8	3.7	3.8	3.6	3.7	3.7	3.7
	EEIS CumEff	3.5	3.7	3.7	3.7	3.7	3.6	3.7	3.7	3.6
Haplopappus liatriformis	UCRB BLM/FS	2.2	4.8	4.9	4.9	4.9	4.9	4.9	4.9	4.9
	UCRB CumEff	2.2	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Howellia aquatilis	EEIS BLM/FS	4.2	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
	EEIS CumEff	3.4	3.6	3.6	3.6	3.7	3.7	3.7	3.7	3.7
	UCRB BLM/FS	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	UCRB CumEff	3.1	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.2
Lomatium suksdorfii	EEIS BLM/FS	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	EEIS CumEff	3.4	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Mimulus pygmaeus	EEIS BLM/FS	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	EEIS CumEff	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Mimulus washingtonensis var. *washingtonensis*	EEIS BLM/FS	3.7	3.8	3.8	3.7	3.7	3.7	3.7	3.7	3.8
	EEIS CumEff	3.7	3.8	3.8	3.7	3.7	3.7	3.7	3.7	3.8
Mirabilis macfarlanei	EEIS BLM/FS	3.1	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.9
	EEIS CumEff	3.1	4.5	4.3	4.2	4.2	4.2	4.2	4.2	4.1
	UCRB BLM/FS	3.1	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.7
	UCRB CumEff	3.1	4.0	4.0	3.9	3.9	3.9	3.9	3.9	3.9
Penstemon glaucinus	EEIS BLM/FS	3.6	3.3	3.2	3.2	3.2	3.2	3.2	3.2	3.3
	EEIS CumEff	3.6	3.3	3.2	3.2	3.2	3.2	3.2	3.2	3.3
Penstemon lemhiensis	UCRB BLM/FS	3.3	3.7	3.7	3.7	3.2[3]	3.1[3]	3.2[3]	3.1[3]	3.6
	UCRB CumEff	3.3	3.8	3.8	3.8	3.3[3]	3.2[3]	3.3[3]	3.2[3]	3.6
Polemonium pectinatum	EEIS BLM/FS	4.4	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	EEIS CumEff	2.2	4.9	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Silene spaldingii	EEIS BLM/FS	4.5	4.5	4.5	4.5	4.3	4.3	4.3	4.3	4.5
	EEIS CumEff	2.2	4.8	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Stephanomeria malheurensis	EEIS BLM/FS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Trifolium thompsonii	EEIS BLM/FS	3.5	3.5	3.6	3.6	3.6	3.5	3.6	3.5	3.6
	EEIS CumEff	3.5	3.5	3.6	3.6	3.5	3.5	3.5	3.5	3.5

[1]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[2]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[3]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table may be misleading.

Rare taxa that were evaluated varied in their successional relations, which substantially influenced the projected outcomes. Some of the regional endemic taxa are associated with early-seral habitats (for example, *Astragalus paysonii, Grindelia howellii, Penstemon glaucinus*). This response is best exemplified by *Grindelia howellii*, for which it is believed that moderate habitat disturbance (from historic to current conditions) has led to an increase in abundance (fig. 4.3). Such species

are nonetheless often considered of rangewide conservation concern, despite their occurrence in disturbed settings. This is because of their limited geographic ranges and the typically low number of populations that occur in more stable habitats. Their affinity to ephemeral, frequently disturbed habitats renders them more susceptible to frequent local extirpations. In these cases, prescriptions that include maintenance or creation of canopy openings, via silvicultural treatment or prescribed burning, were rated as more likely to produce favorable habitat and population conditions.

Mid-seral species include such taxa as *Cypripedium fasciculatum* (scattered distribution) and *Castilleja chlorotica* (regional endemic). As illustrated for the former species in figure 4.4, the alternatives that include prescriptions involving thinning or prescribed burning, such that partial shade or small openings might be enhanced, were rated as likely to produce more favorable outcomes.

Figure 4.3 *Grindelia howellii*

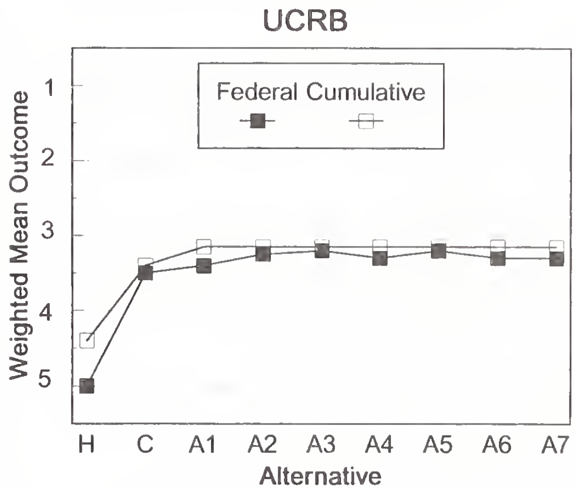

Figure 4.3. Weighted mean outcome scores for *Grindelia howellii* in the UCRB planning area for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid line indicates scores for habitat conditions on Federal lands only; open line indicates projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Species that are essentially confined to late-seral community types include those affiliated with the Palouse grasslands throughout all, or a significant portion, of their ranges. The Palouse prairie vegetation type is estimated to have been eliminated from 98 percent of its original acreage (Risser 1981) owing primarily to agricultural conversion of non-Federal lands. Four of the rare plant taxa analyzed are associated with this community type, and have some of their occurrences on Federal lands; these include *Calochortus nitidus, Haplopappus liatriformis, Polemonium pectinatum,* and *Silene spaldingii.* All of these have suffered extensive historical losses of habitat and populations in the non-Federal portions of their ranges. In addition, one species that occurs exclusively on non-Federal lands (*Aster jessicae*) is also associated with this community type; its viability has been even more seriously and adversely affected. Extant populations of these taxa are found only in high-quality remnants of such habitats. While the preliminary draft EISs do not include proposed alternatives that would directly affect these species on non-Federal lands, the species are all of serious conservation concern within the Basin, as is the remaining extant Palouse grassland in general. The outcomes for *C. nitidus* and *S. spaldingii* exemplify this group of regional endemic species, and are indicated in figures 4.5 and 4.6, respectively. The cumulative effects of extreme loss of habitat and population integrity on non-Federal lands are clearly evident, especially for *S. spaldingii* in the EEIS area, and for *C. nitidus* in the UCRB area. Any prescriptions that would reduce the habitat on the Federal portions of these species' ranges are expected to have more serious, negative effects on them. These results also strongly indicate the critical role that Federal lands play as refugia for the extant habitats and populations of these, and many other, plant taxa of rangewide conservation concern.

The upland shrub group is another plant community group of major importance in providing habitat for vascular plants of rangewide conservation concern in the Basin, specifically the sagebrush region of the upper Snake and Columbia River plains. Five regional endemic species,

including *Penstemon lemhiensis* and four taxa in the genus Astragalus (*A. mulfordiae, A. oniciformis, A. solitarius, and A. yoder-williamsii*), are primarily associated with such upland shrub communities. The outcomes for *A. mulfordiae* and *P. lemhiensis* exemplify these species, and are summarized in figures 4.7 and 4.8, respectively. Suitable habitat for all of these taxa was historically more abundant, but has decreased in quantity, quality, and contiguity, producing less favorable current out-

Figure 4.4 *Cypripedium fasciculatum*

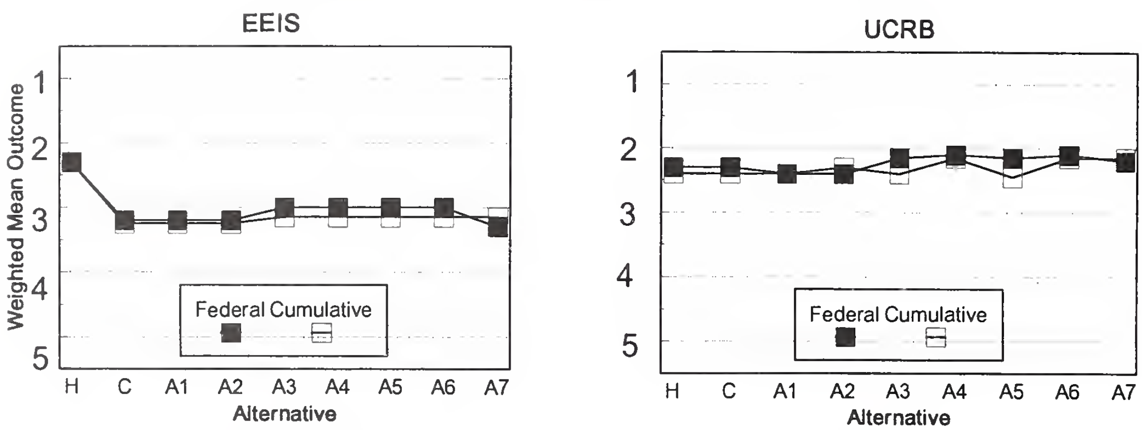

Figure 4.4. Weighted mean outcome scores for *Cypripedium fasciculatum* in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; open lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.5 *Calochortus nitidus*

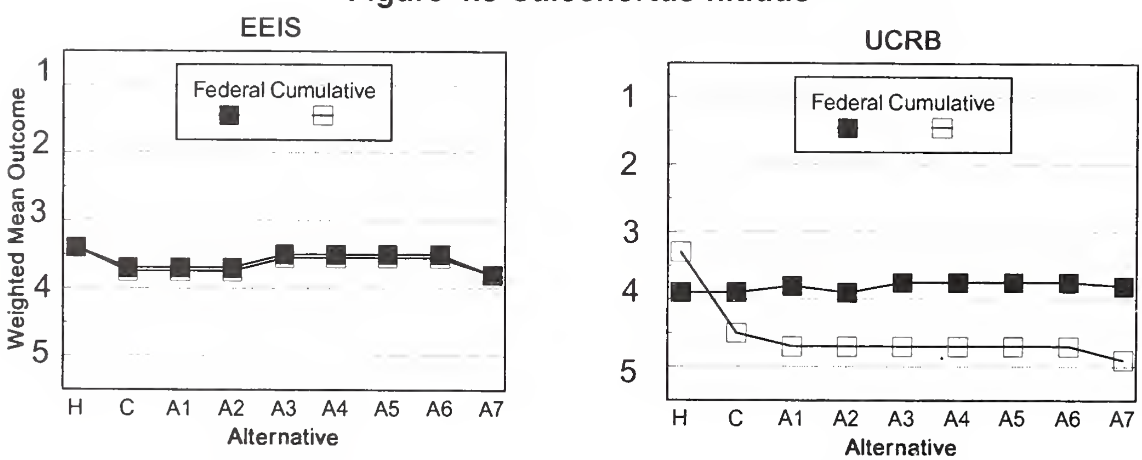

Figure 4.5. Weighted mean outcome scores for *Calochortus nitidus* in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; open lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.6 *Silene spaldingii*

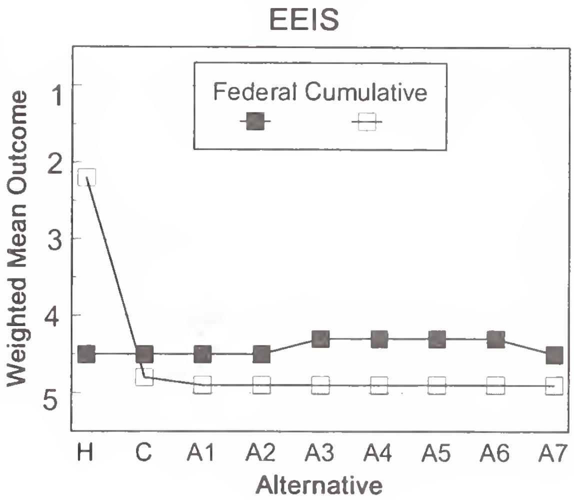

Figure 4.6. Weighted mean outcome scores for *Silene spaldingii* in the EEIS planning area for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid line indicates scores for habitat conditions on Federal lands only; open line indicates projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

comes. Such habitats would be largely unaffected by the screens or aquatic buffers instituted under Alternative 2, so that for many of these taxa the outcome ratings for Alternatives 1 and 2 were often essentially the same. Restoration prescriptions under Alternatives 4 and 6, specifically those that would restore the natural fire regime and reduce grazing, have the possibility of returning some habitat to historic conditions, especially for *Penstemon lemhiensis*. Such prescriptions would be favorable to all of these species, although for some, much of their former habitat has been converted by range seedings, and will be difficult to restore. Conversely, Alternatives 3, 5, and 7 are projected to result in less favorable habitat conditions due to the spread of exotic species, habitat conversion to non-native grass seedings, grazing, and changes in the fire regime.

Three *Botrychium* species with scattered distributions were assessed. These widespread taxa occur sparsely on Federal lands across both planning areas, although their distributions and status are not as well understood as the other vascular plants analyzed. *Botrychium crenulatum*, a species that is often associated with moist old-growth forest

Figure 4.7 *Astragalus mulfordiae*

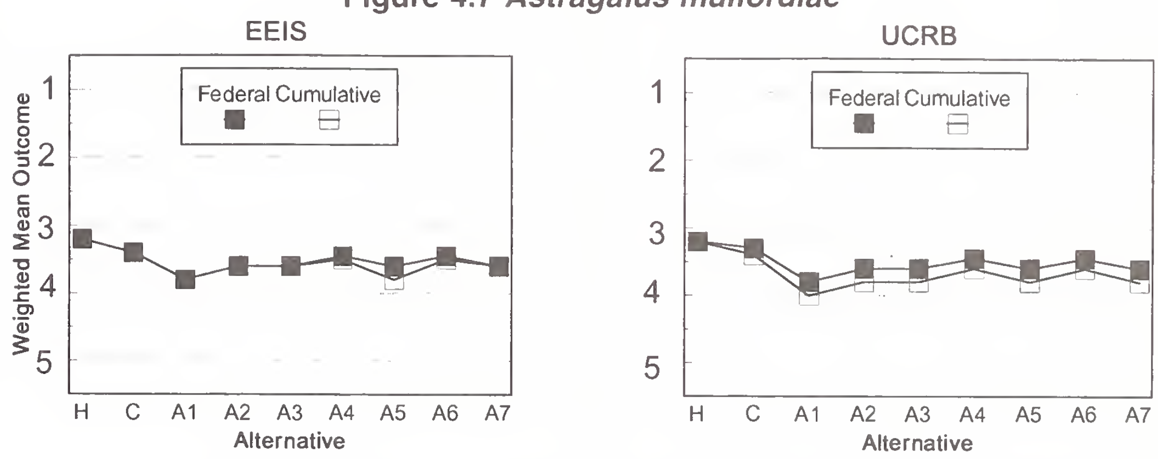

Figure 4.7. Weighted mean outcome scores for *Astragalus mulfordiae* in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; open lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

stands of western red cedar, would benefit from the aquatic buffers proposed in Alternatives 2, 3, and 7 (fig. 4.9). The implementation of the riparian habitat management standards under Alternatives 2, 3, and 7 would be expected to slightly benefit habitat for two other taxa in addition to *B. crenulatum;* they are *Calochortus longebarbatus* var. *longebarbatus* and *C. longebarbatus* var. *peckii.*

As noted previously, conservation agreements have been adopted for seven of the plant species that we analyzed. In these cases, the existence of specific standards and guidelines from the conservation strategies was considered in the rating process. The standards would protect occupied habitats, and thus the long-term viability of such species, regardless of the prescriptions applied to their general locations in the alternatives. In addition, numerous other plant taxa that were not analyzed, of both rangewide and State conservation concern, have conservation agreements or strategies either approved or in preparation. These strategies will provide a critical means of conserving habitat and population integrity at the local and subregional scales.

Because many of the taxa analyzed are either associated with early- or mid-seral successional stages,

Figure 4.8 *Penstemon lemhiensis*

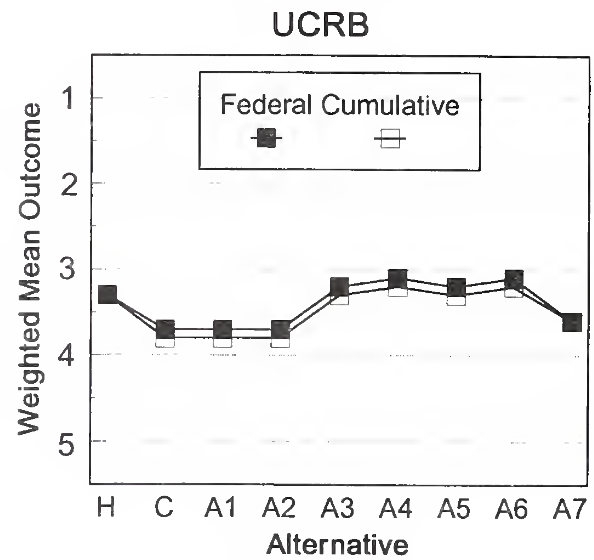

Figure 4.8. Weighted mean outcome scores for *Penstemon lemhiensis* in the UCRB planning area for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid line indicates scores for habitat conditions on Federal lands only; open line indicates projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.9 *Botrychium crenulatum*

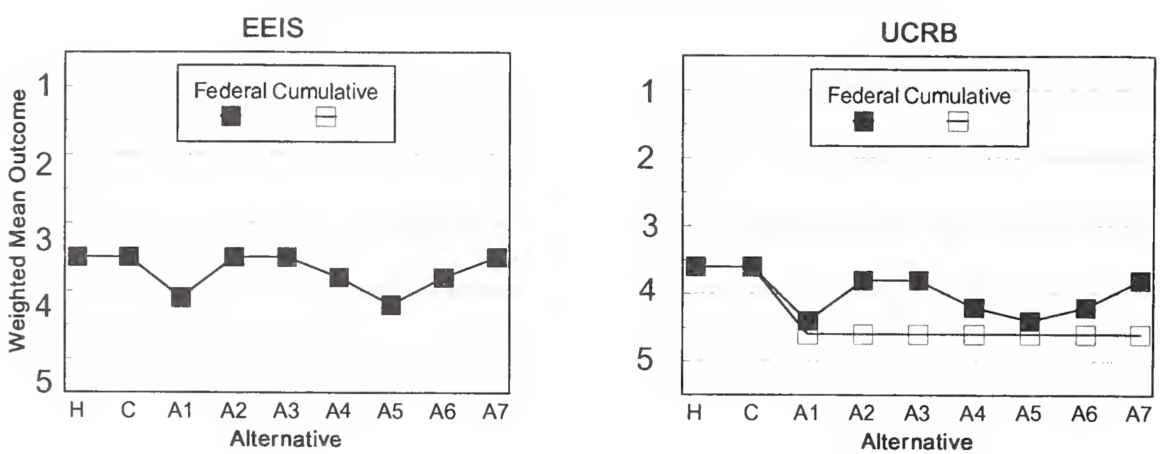

Figure 4.9. Weighted mean outcome scores for *Botrychium crenulatum* in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; open lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives. Weighted mean scores were equal in the EEIS planning area for the Federal habitat and the cumulative effects assessments.

or would benefit from restoration prescriptions emphasized under Alternatives 4 and 6, Alternative 7 was generally rated as less favorable (fig. 4.2). The reserve strategy of Alternative 7 was judged to be less effective in maintaining the dynamic habitat conditions favorable to these species.

In conclusion, a key limitation of the analysis of effects on plants should be reiterated. The majority of the plant taxa of greatest rangewide conservation concern in the Basin have not been addressed here, because they could not be meaningfully assessed at this broad scale. Assessed species include only those that, by virtue of their broader distributions or habitat associations, could be analyzed at the scale of the preliminary draft EIS areas. In addition, there are many plant taxa that, while secure on a rangewide level, are rare at the state level in one or more states in the Basin. Conservation of these species of local concern is also an important consideration, as their populations often occur largely or wholly on Federal lands. These peripheral or disjunct populations may also be genetically divergent from those within the main range of the species. Many such taxa of state or sub-regional concern are currently designated as sensitive by the Forest Service or BLM, along with those that are of concern on a rangewide scale.

Amphibians and Reptiles

Introduction—The overall "Methods for Assessing Effects on Terrestrial Species" section outlines the process used to select the amphibian and reptile species that were assessed. The list of selected amphibian species includes the Cascades frog, Coeur d'Alene salamander, northern leopard frog, red-legged frog, rough-skinned newt, spotted frog, tailed frog, tiger salamander, western toad, and Woodhouse's toad (scientific names of vertebrate species are in appendix 4-C). At the time of our assessment, the Cascades frog, red-legged frog, spotted frog, tailed frog, and western toad were identified as USFWS C2 Candidate species, and the Coeur d'Alene salamander and rough-skinned newt were BLM and/or Forest Service sensitive species. The northern leopard frog, tiger salamander, and Woodhouse's toad were initially selected because of past population declines, because their habitat has declined from historic levels, or because possible habitat declines were projected under at least one preliminary draft EIS alternative.

The list of reptilian species initially presented to the panel for assessment included the desert horned lizard, longnose leopard lizard, Mojave black-collared lizard, night snake, painted turtle, ringneck snake, rubber boa, sagebrush lizard, sharptail snake, short-horned lizard, striped whipsnake, and western pond turtle. The sagebrush lizard was included because it was a USFWS C2 species, as was the western pond turtle because it was a USFWS C3 species and was considered a sensitive species by the FS or BLM. The painted turtle, night snake, and ringneck snake were included because they are considered sensitive species by the Forest Service or BLM. The desert horned lizard, longnose leopard lizard, Mojave black-collared lizard, short-horned lizard, rubber boa, sharptail snake, and striped whipsnake were initially included because of past population declines, because their habitat has declined from historic levels, or because possible habitat declines were projected under at least one of the preliminary draft EIS alternatives.

Methods—During panel discussions, we dropped the rough-skinned newt from further consideration because the Idaho and Montana populations may not be native and the species is not considered sensitive in Idaho. The Cascades and red-legged frogs were dropped from further consideration because the species' ranges within the Basin fall entirely within the area of the Northwest Forest Plan (NFP). The EEIS and UCRB preliminary draft EIS alternatives are not designed to reduce the habitat provided by the NFP. The NFP was considered to sufficiently address these species' habitat requirements on Federal land. Therefore, additional analysis was considered unnecessary. The panel concluded that

the tiger salamander would not be affected by management practices on Federal lands, and that ranching and farming may have increased the species' distribution. Thus, the tiger salamander was not considered further. The spotted frog was split into two species for evaluation by the panel—spotted frog species A and spotted frog species B (Green and others 1996). The final list of amphibian species evaluated included the Coeur d'Alene salamander, western toad, Woodhouse's toad, tailed frog, spotted frog species A, spotted frog species B, and northern leopard frog.

Changes were also made in the list of reptilian species that we assessed. During panel discussions, the ringneck snake was deleted from further consideration because there are very few locality records within the Basin and the panelists had insufficient information about the species to evaluate effects of the preliminary draft EIS alternatives. The panel added the common garter snake to the list because the panel concluded that the species is declining in Idaho.

Results—Following the assessment panel, we adjusted the species outcomes in the Forest Service and BLM habitat evaluation for the Coeur d'Alene salamander, northern leopard frog, Oregon spotted frog, Woodhouse's toad, and sharptail snake. These adjustments addressed the tendency of panelists to reflect cumulative effects in the Federal habitat assessment. The adjustments also reflected improved riparian habitat retention/restoration provisions for some alternatives that were obtained after the panel discussion had concluded. Results are shown in table 4.5, the mean outcomes for each species (following any adjustments), and table 4.6, the weighted mean species outcomes. Standard deviations of these outcomes are shown in appendix 4-D. The weighted means for each alternative are shown in figures 4.10 and 4.11. The number of species whose weighted mean fell into each outcome under each alternative is shown in figures 4.12 and 4.13, and the numbers of species whose weighted mean outcome changed by more than 0.5 outcome units between current and the projected future under each preliminary draft EIS alternative are shown in figures 4.14 and 4.15.

Discussion—Habitat on lands outside of BLM- and FS-administered land has declined due to conversion to agricultural and urban uses. Habitat for amphibians on BLM- and FS-administered land, although reduced from historic conditions, is less modified than habitat on non-Federal land and plays an important role in providing for these species. Restoring historic habitat conditions across the Federal landscape is a critical step toward re-establishment or retention of amphibian and reptilian populations throughout the ICBEMP planning area. Some alternatives would begin to restore habitat on Federal lands.

The amphibian and reptilian assessment panel identified specific attributes that were key for evaluating habitat on Federal lands. These included: riparian habitat retention and restoration, grazing intensity on rangelands, management of wetlands, percentage of land reserved from ground-disturbing activities, restoration efforts, levels of timber harvest, amounts of forest fragmentation, restoration of upland native plant communities, and conversion to non-native vegetation.

The most important attributes for evaluating cumulative effects on species populations, in addition to those listed above, included pollution (agricultural chemical runoff), introduction of non-native predators (bullfrogs, crappie, bluegill, and bass), conversion to agriculture, fungal disease, wetland development, water diversion, global climate change, effects of glaciers receding resulting in fragmented populations, ultraviolet radiation, water control at major dams, lack of enforcement of reptile collection by commercial collectors, predation (especially by skunks and raccoons), and development/urbanization.

Amphibians—The results for habitat on BLM- and FS-administered lands were generally similar for the amphibians and riparian-associated reptiles indicating that current habitat on these lands has declined from its historic distribution (table 4.5

and fig. 4.10). Habitat conditions for most riparian-associated species have declined on BLM- and FS-administered lands by one outcome level (table 4.6 and fig. 4.12). Habitat that had historically broad or patchy distribution, with at least limited interactions between populations, has been reduced to habitat that is now distributed as isolated patches. This has resulted in strong limitations on interactions between populations, some local extirpations, and slow recolonization. For these species, Federal land habitat declines from historic conditions are primarily tied to increased human disturbance, fragmentation of habitat, and reduced riparian area acreage and quality.

Further decline in habitat conditions for the riparian-associated amphibian species is generally projected under Alternatives 1 and 5 (fig. 4.12). Alternatives 2, 3, 4, 6, and 7 provide habitat quality, quantity, and distribution that are similar to current habitat conditions, or slightly increased, for most amphibians and riparian-associated reptiles (figs. 4.12 and 4.14). Cumulative effects on populations of these species generally result in more isolated populations and, in some cases, contribute to higher risks of extirpation.

Coeur d'Alene salamander. The Coeur d'Alene salamander occurs in northeastern Idaho, northwestern Montana, and British Columbia. There are currently about 120 known populations. About 80 percent of the habitat within the UCRB EIS area is managed by the Forest Service and much of the remainder is on private industrial land. Coeur d'Alene salamander is found in springs, seeps, spray zones, and wet talus slopes in forested areas below 5,000 feet. The species generally does not move far from the riparian zone.

We considered the size of riparian buffers around intermittent streams and small wetlands, and levels of harvest in currently undisturbed forest as the most important attributes when evaluating the effects of the alternatives on habitat on Federal land. We estimated historic conditions for Coeur d'Alene salamander as 40 percent likelihood of Outcome 3 (habitat primarily as patches, limited species interactions, and subpopulations interact as a metapopulation), 50 percent likelihood of Outcome 4 (habitat typically distributed as isolated patches, limited dispersal among patches, and some local extirpations), and 10 percent likelihood of Outcome 5 (scarce habitat, little or no population interactions, and strong potential for extirpations). Current conditions were estimated to have increased likelihood of Outcomes 4 and 5, and this trend was projected to continue under Alternatives 1 and 5 (table 4.5). Slight improvements in habitat or no change would occur under Alternatives 2, 3, 4, 6, and 7. These outcomes reflect our estimation of increases in ground disturbing activity near sites inhabited by Coeur d'Alene salamander. We suggest a need for continued surveys and site-specific protection, avoiding hydrologic disturbance during road building, and restricting insecticide spraying near suitable habitat. The evaluation of cumulative effects on populations suggests an increased likelihood of Outcome 5 under the alternatives, with all alternatives having a likelihood of 50 or more points in Outcome 5. This reflects effects of past management and disturbance, and a likelihood of increased fragmentation and isolation of populations due to global warming.

Western toad. The range of the western toad encompasses most of the Basin, with gaps in rangelands in the Columbia Plateau, the Northern Great Basin, Upper Snake and Owyhee Uplands. The panel suggested that the range perimeter for the western toad has not changed, but that populations within the range have declined in some locations (Blaustein and others 1994). Nussbaum and others (1983) described the breeding habitat of western toads as spring pools, ponds, lake shallows, and slow moving portions of streams. Much of the species' habitat within the Basin is on Federal land.

Timber harvest, size of riparian buffers, grazing intensity, and restoration of habitat were important considerations in evaluating the effects of the alternatives on habitat on Federal land. The UCRB EIS area generally has lower overall outcomes under all timeframes and EIS alternatives.

Figure 4.10 Amphibians

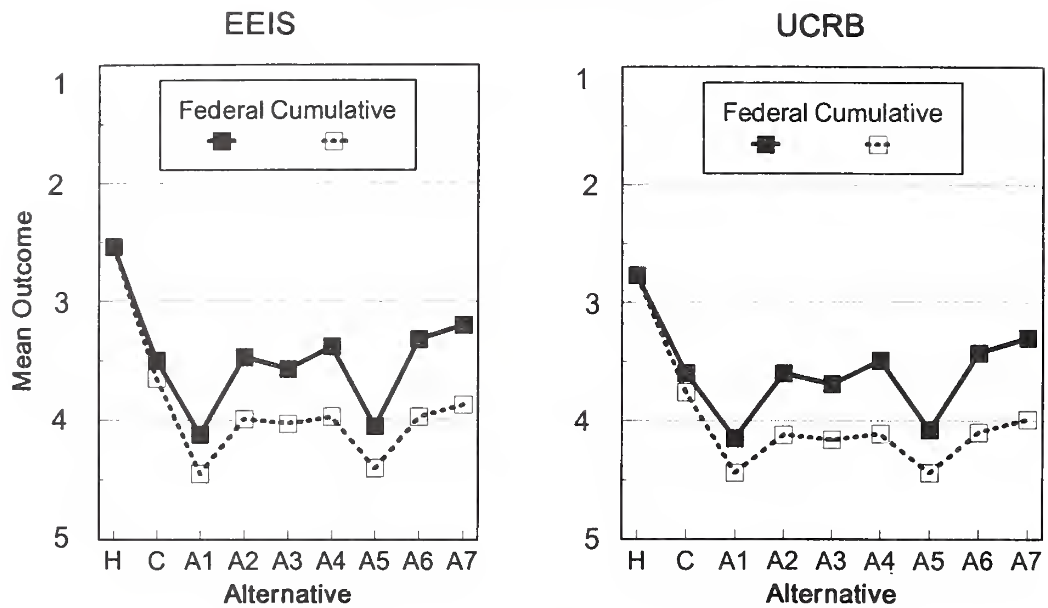

Figure 4.10. Mean outcome scores averaged over six species of amphibians in the EEIS and UCRB planning areas for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.11 Reptiles

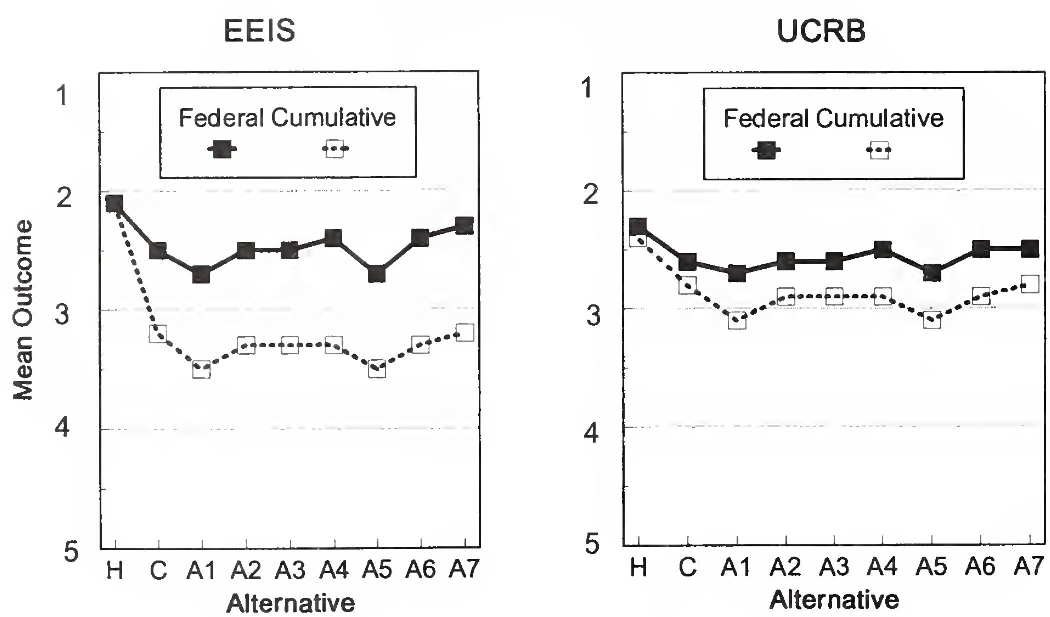

Figure 4.11. Mean outcome scores averaged over 11 species of reptiles in the EEIS planning area and nine species in the UCRB planning area for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

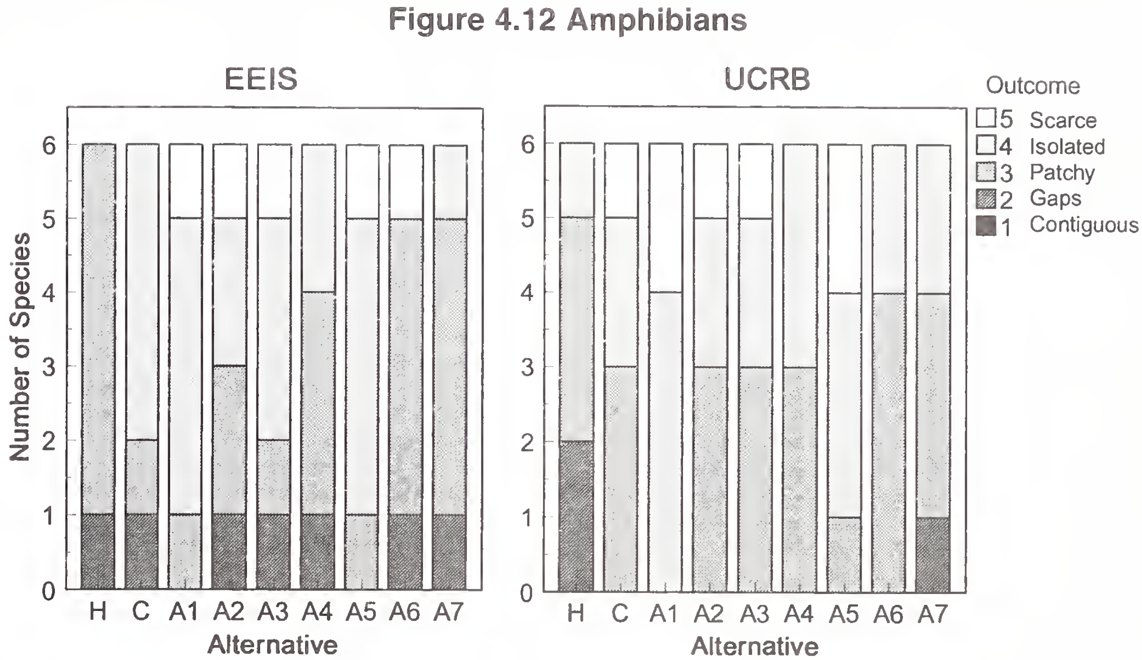

Figure 4.12. Frequency distribution of mean habitat outcome scores for six species of amphibians on Federal lands in the EEIS and UCRB planning areas for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

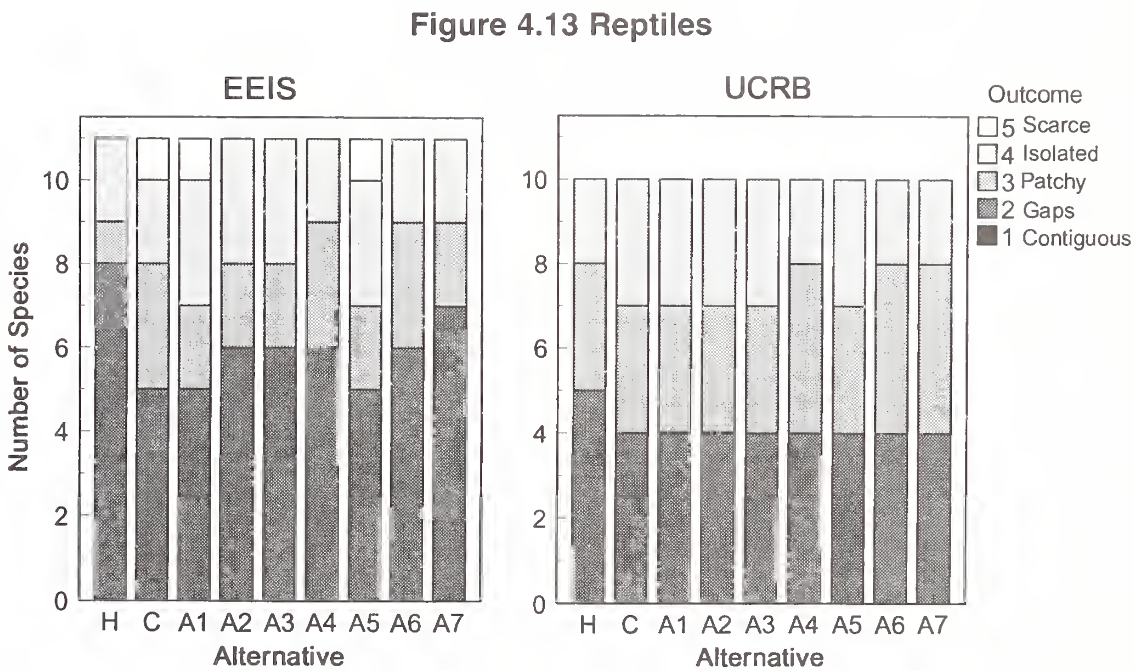

Figure 4.13. Frequency distribution of mean habitat outcome scores for 11 species of reptiles on Federal lands in the EEIS planning area and 10 species in the UCRB planning area for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

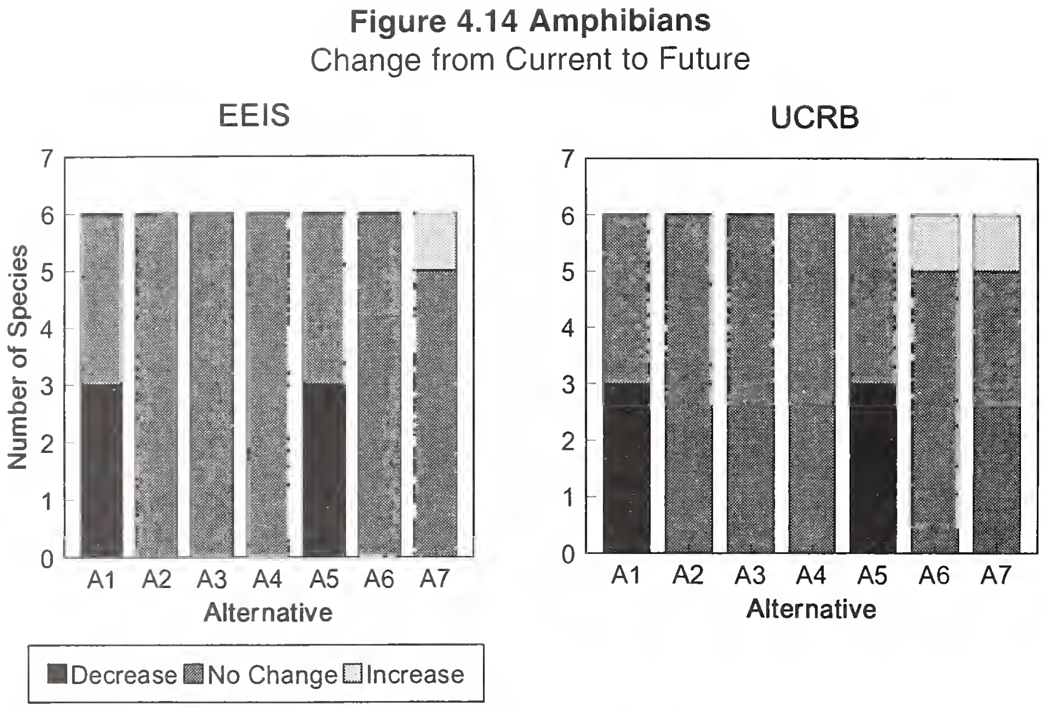

Figure 4.14. Departure of habitat outcomes on Federal lands from current conditions to each alternative for six species of amphibians in the EEIS and UCRB planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

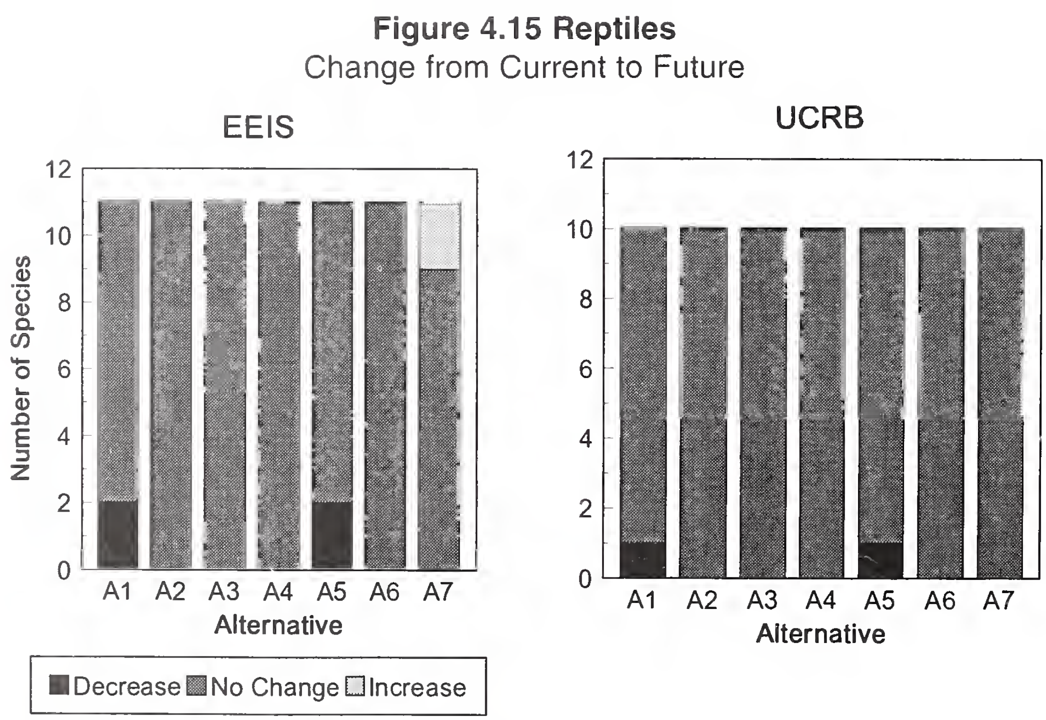

Figure 4.15. Departure of habitat outcomes on Federal lands from current conditions under each alternative for 11 species of reptiles in the EEIS planning area and 10 species in the UCRB planning area. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

The spread of points across three or more outcomes suggests some uncertainty about the effects of the alternatives on the species' habitat (appendix 4-D). The analysis of cumulative effects indicates that there is some likelihood of extirpation (Outcome 5) of western toad populations under all alternatives, due to the poorly understood, ongoing decline of amphibian populations, even when suitable habitat is present.

Woodhouse's toad. Woodhouse's toad occurs within the Basin in two disjunct populations, in southern Washington along the Columbia and Snake Rivers and in southeastern Oregon and southwestern Idaho near the Snake River. Nussbaum and others (1983) reported that in the Pacific Northwest these toads are at least partially terrestrial during the non-breeding season. They forage at night near water in arid regions and dig burrows or use rodent burrows during the day. Breeding occurs in irrigation ditches and canals, pools in streams, ponds, lake margins, and reservoirs (Nussbaum and others 1983). Vegetation around breeding sites is not critical. Shallower, ephemeral ponds that hold water into July are suitable for breeding habitat. Little of the species' range in Washington is on Federal land and approximately 30 percent of the range in southern Oregon and Idaho is on Federal land (BLM).

The important factors for evaluating the effects of alternatives on habitat on BLM- and FS-administered lands were riparian management, grazing intensity, and conversion to exotic vegetation. Declines in habitat on Federal lands from historic to current levels reflect these three factors (table 4.5). Habitat on Federal lands was considered important because it supplies the least altered conditions for these toads, but some panelists indicated that Federal management alone could not improve or affect overall populations. Historic habitat conditions are estimated at greater than 90 percent likelihood of Outcomes 1, 2, or 3, whereas current conditions were estimated at 88 percent likelihood of Outcomes 2, 3, or 4 (EEIS) or 95 percent likelihood of Outcome 3 or 4. Further isolation of habitat is predicted under Alternatives 1, 3, and 5, whereas Alternatives 2, 4, 6, and 7 are projected to somewhat reduce habitat fragmentation. Cumulative effects strongly affect woodhouse's toad populations as all alternatives have high (45 to 70%) likelihoods of Outcome 5 (highly isolated populations having little or no population interactions and strong potential for extirpations). Most of the historic population loss is associated with agricultural conversion, pollution, conversion of habitat to non-native vegetation, and non-native predator introductions (bullfrog and fish).

Tailed frog. The range of the tailed frog within the Basin is primarily within the forested land on the eastern slope of the Cascades, southeastern Washington, Hells Canyon National Recreation Area, northern Idaho, and northwestern Montana. Welsh (1990) reported that tailed frogs occur in isolated populations in and along streams in the Pacific Northwest and are highly specialized for life in cold, clear, fast-flowing, mountain streams. Tailed frogs inhabit streams with continuous flow and cold, well-aerated waters and are not found in intermittent streams (Brown 1990). Daugherty and Sheldon (1982) reported that no adults moved more than 40 meters from first capture sites during their study, although when air temperatures are low and humidity is high, adults may move into woods near creeks to forage. Bury and Corn (1988) captured some adults 100 to 300 meters from water. Welsh (1990) reported that tailed frogs are found primarily in mature and old-growth habitats. Panelists stated that logging near streams is presumed to cause habitat degradation due to siltation.

Timber harvest, riparian buffers, and levels of restoration activities were important factors in evaluating the effects of the alternatives on habitat on BLM- and FS-administered lands. All preliminary draft EIS alternatives have some likelihood of Outcome 5. Cumulative effects analysis for the tailed frog populations projects higher likelihoods of Outcome 5 under Alternatives 1 and 5 largely due to the projected losses in Federal habitat under those alternatives.

Table 4.5. Mean likelihood scores of viability outcomes for amphibians and reptiles for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means are calculated from the individual likelihood scores of panelists.

				Period / Alternative[4]								
Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
AMP	Coeur d'Alene salamander	UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	40	3	0	5	0	5	0	5	10
			4	50	63	45	65	70	70	45	70	75
			5	10	33	55	30	30	25	55	25	15
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	40	3	0	0	0	0	0	0	3
			4	50	57	15	22	23	28	15	32	45
			5	10	40	85	78	77	72	85	68	52
AMP	Spotted frog species B	EEIS BLM/FS	1	20	0	0	0	0	0	0	0	0
			2	30	0	0	0	0	0	0	0	0
			3	35	60	30	65	60	65	33	65	73
			4	10	30	50	25	30	25	50	25	20
			5	5	10	20	10	10	10	18	10	8
		EEIS CumEff	1	20	0	0	0	0	0	0	0	0
			2	30	0	0	0	0	0	0	0	0
			3	35	60	25	58	53	58	28	58	65
			4	10	30	55	30	35	30	55	30	25
			5	5	10	20	13	13	13	18	13	10
		UCRB BLM/FS	1	25	0	0	0	0	0	0	0	3
			2	50	20	5	18	18	20	5	20	23
			3	15	50	40	55	50	55	43	55	58
			4	10	30	50	28	33	25	50	25	18
			5	0	0	5	0	0	0	3	0	0
		UCRB CumEff	1	25	0	0	0	0	0	0	0	0
			2	50	20	0	18	18	18	3	18	20
			3	15	50	40	50	45	50	40	50	55
			4	10	30	55	33	38	33	55	33	25
			5	0	0	5	0	0	0	3	0	0
AMP	Northern leopard frog	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	17	0	0	0	0	0	0	0	0
			3	50	17	0	10	0	15	0	15	20
			4	33	20	27	30	40	30	35	30	30
			5	0	63	73	60	60	55	65	55	50
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	17	0	0	0	0	0	0	0	0
			3	50	17	0	0	0	0	0	0	0
			4	33	20	3	5	5	8	3	8	15
			5	0	63	97	95	95	92	97	92	85

Table 4.5 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB BLM/FS[5]	1	3	0	0	0	0	0	0	0	0
			2	33	0	0	0	0	0	0	0	5
			3	33	0	0	10	0	20	0	25	30
			4	30	30	7	27	37	33	30	35	35
			5	0	70	93	63	63	47	70	40	30
		UCRB CumEff	1	3	0	0	0	0	0	0	0	0
			2	33	0	0	0	0	0	0	0	0
			3	33	0	0	0	0	0	0	0	0
			4	30	23	3	5	5	5	3	5	15
			5	0	77	97	95	95	95	97	95	85
AMP	Spotted frog species A	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	5	0	10	0	15	20
			3	30	50	20	45	50	50	25	50	55
			4	10	40	50	40	40	35	50	30	20
			5	0	10	30	10	10	5	25	5	5
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	0	0	0	0	0	0
			3	30	50	20	45	45	45	25	45	50
			4	10	40	50	40	40	40	50	40	40
			5	0	10	30	15	15	15	25	15	10
AMP	Tailed frog	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	50	25	0	25	15	30	0	30	38
			3	25	45	13	45	45	40	20	40	35
			4	20	18	65	20	30	18	60	18	18
			5	5	13	23	10	10	13	20	13	10
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	50	25	0	0	0	0	0	0	0
			3	25	45	8	48	33	45	10	45	55
			4	20	18	25	38	43	38	30	38	33
			5	5	13	68	15	25	18	60	18	13
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	47	23	3	25	18	27	3	27	35
			3	28	43	18	45	45	42	25	42	37
			4	22	22	57	22	27	22	55	23	22
			5	3	12	22	8	10	10	17	8	7
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	47	23	3	5	5	5	3	5	7
			3	28	43	20	47	37	45	20	45	50
			4	22	22	27	37	42	37	32	37	32
			5	3	12	50	12	17	13	45	13	12
AMP	Western toad	EEIS BLM/FS	1	40	10	0	13	10	15	0	15	25
			2	45	50	20	55	58	53	20	53	50
			3	15	35	20	33	33	33	25	33	25
			4	0	5	60	0	0	0	55	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.5 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	40	0	0	0	0	0	0	0	0
			2	45	20	5	13	13	18	8	18	23
			3	15	45	15	45	45	40	15	40	40
			4	0	25	20	35	35	35	20	35	30
			5	0	10	60	8	8	8	58	8	8
		UCRB BLM/FS	1	27	7	0	8	7	10	0	10	17
			2	43	45	15	42	43	40	15	40	40
			3	23	33	23	35	33	33	28	35	30
			4	7	13	55	12	13	13	52	12	12
			5	0	2	7	3	3	3	5	3	2
		UCRB CumEff	1	27	0	0	0	0	0	0	0	0
			2	43	18	3	8	8	12	5	12	17
			3	23	40	20	40	38	35	17	37	35
			4	7	30	23	37	37	37	27	37	33
			5	0	12	53	15	17	17	52	15	15
AMP	Woodhouse's toad	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	55	0	0	5	2	10	0	15	15
			3	40	25	5	20	15	25	5	30	35
			4	5	65	45	50	50	50	50	50	45
			5	0	10	50	25	33	15	45	5	5
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	55	0	0	0	0	0	0	0	0
			3	40	25	0	0	0	0	0	0	0
			4	5	65	30	45	45	50	35	50	55
			5	0	10	70	55	55	50	65	50	45
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	25	0	0	5	2	10	0	15	15
			3	50	30	5	20	15	25	5	30	35
			4	25	65	55	50	50	50	55	50	45
			5	0	5	40	25	33	15	40	5	5
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	25	0	0	0	0	0	0	0	0
			3	50	30	0	0	0	0	0	0	0
			4	25	65	30	35	35	43	30	43	45
			5	0	5	70	65	65	58	70	58	55
REP	Common garter snake	EEIS BLM/FS	1	50	0	0	0	0	0	0	0	0
			2	50	50	0	50	50	50	0	50	50
			3	0	50	50	50	50	50	50	50	50
			4	0	0	50	0	0	0	50	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	50	0	0	0	0	0	0	0	0
			2	50	0	0	0	0	0	0	0	0
			3	0	50	0	50	50	50	0	50	50
			4	0	50	50	50	50	50	50	50	50
			5	0	0	50	0	0	0	50	0	0

Table 4.5 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB BLM/FS	1	50	0	0	0	0	0	0	0	0
			2	50	50	23	50	50	50	23	50	53
			3	0	40	40	40	40	40	40	40	43
			4	0	10	38	10	10	10	38	10	5
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	50	0	0	0	0	0	0	0	0
			2	50	25	20	23	23	23	20	23	25
			3	0	40	18	43	43	43	18	43	40
			4	0	35	38	35	35	35	38	35	35
			5	0	0	25	0	0	0	25	0	0
REP	Desert horned lizard	EEIS BLM/FS	1	50	45	40	45	45	45	40	45	50
			2	50	55	60	55	55	55	60	55	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	50	45	40	45	45	45	40	45	50
			2	50	55	60	55	55	55	60	55	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	50	45	40	45	45	45	40	45	50
			2	50	55	60	55	55	55	60	55	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	50	45	40	45	45	45	40	45	50
			2	50	55	60	55	55	55	60	55	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
REP	Longnose leopard lizard	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	30	20	30	30	30	20	30	35
			4	50	60	60	60	60	60	60	60	55
			5	0	10	20	10	10	10	20	10	10
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	25	20	25	25	25	20	25	30
			4	50	60	55	60	60	60	55	60	60
			5	0	15	25	15	15	15	25	15	10
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	30	20	30	30	30	20	30	35
			4	50	60	60	60	60	60	60	60	55
			5	0	10	20	10	10	10	20	10	10

Table 4.5 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	25	20	25	25	25	20	25	30
			4	50	60	55	60	60	60	55	60	60
			5	0	15	25	15	15	15	25	15	10
REP	Mojave-collared lizard	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	50	30	20	30	30	30	20	30	35
			3	50	60	60	60	60	60	60	60	55
			4	0	10	20	10	10	10	20	10	10
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	40	20	25	25	25	20	25	30
			4	20	40	40	60	60	60	40	60	60
			5	30	20	40	15	15	15	40	15	10
REP	Night snake	EEIS BLM/FS	1	50	50	50	50	50	50	50	50	50
			2	50	50	50	50	50	50	50	50	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	50	0	0	0	0	0	0	0	0
			2	50	50	50	50	50	50	50	50	50
			3	0	50	50	50	50	50	50	50	50
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	50	45	40	45	45	45	40	45	50
			2	50	55	60	55	55	55	60	55	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	50	40	35	40	40	40	35	40	45
			2	50	60	65	60	60	60	65	60	55
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
REP	Painted turtle	EEIS BLM/FS	1	5	0	0	0	0	0	0	0	5
			2	50	40	15	35	35	45	15	45	50
			3	45	55	50	40	40	50	50	50	45
			4	0	5	35	25	25	5	35	5	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	5	0	0	0	0	0	0	0	0
			2	50	20	10	20	20	20	13	20	20
			3	45	35	20	30	30	40	20	40	45
			4	0	45	40	30	30	40	40	40	35
			5	0	0	30	20	20	0	28	0	0

Table 4.5 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	50	35	18	33	30	40	18	43	50
			3	50	65	58	48	50	60	58	58	50
			4	0	0	25	20	20	0	25	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	50	15	10	15	13	13	10	15	18
			3	50	35	20	30	30	40	20	40	45
			4	0	50	45	35	38	48	45	45	38
			5	0	0	25	20	20	0	25	0	0
REP	Rubber boa	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	50	0	0	0	0	10	0	10	30
			3	50	50	10	50	50	50	10	50	50
			4	0	50	90	50	50	40	90	40	20
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	50	0	0	0	0	0	0	0	0
			3	50	50	0	0	0	10	0	10	30
			4	0	50	10	50	50	50	10	50	50
			5	0	0	90	50	50	40	90	40	20
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	25	0	0	0	0	5	0	5	15
			3	50	48	25	48	48	48	25	48	50
			4	25	53	75	53	53	48	75	48	35
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	25	0	0	0	0	0	0	0	0
			3	50	45	15	20	20	25	15	25	38
			4	25	55	40	55	55	55	40	55	53
			5	0	0	45	25	25	20	45	20	10
REP	Sagebrush lizard	EEIS BLM/FS	1	50	50	50	50	50	50	50	50	50
			2	50	50	50	50	50	50	50	50	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	50	0	0	0	0	0	0	0	0
			2	50	50	50	50	50	50	50	50	50
			3	0	50	50	50	50	50	50	50	50
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	50	40	35	40	40	40	35	40	45
			2	50	60	65	60	60	60	65	60	55
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	50	30	20	25	25	25	20	25	30
			2	50	40	35	40	40	40	40	40	40
			3	0	30	45	35	35	35	40	35	30
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.5 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
REP	Sharptail snake	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	0	0	5	5	10	0	20	30
			4	50	50	30	45	45	45	40	40	50
			5	0	50	70	50	50	45	60	40	20
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	0	0	0	0	0	0	0	0
			4	50	50	0	10	10	10	0	10	50
			5	0	50	100	90	90	90	100	90	50
REP	Short-horned lizard	EEIS BLM/FS	1	50	50	50	50	50	50	50	50	50
			2	50	50	50	50	50	50	50	50	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	50	0	0	0	0	0	0	0	0
			2	50	50	50	50	50	50	50	50	50
			3	0	50	50	50	50	50	50	50	50
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	50	40	30	40	40	40	30	40	45
			2	50	60	70	60	60	60	70	60	55
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	50	35	30	35	35	35	30	35	45
			2	50	65	70	65	65	65	70	65	55
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
REP	Striped whipsnake	EEIS BLM/FS	1	50	50	50	50	50	50	50	50	50
			2	50	50	50	50	50	50	50	50	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	50	0	0	0	0	0	0	0	0
			2	50	50	50	50	50	50	50	50	50
			3	0	50	50	50	50	50	50	50	50
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	35	30	35	35	35	30	35	40
			4	50	55	55	55	55	55	55	55	50
			5	0	10	15	10	10	10	15	10	10
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	35	30	30	30	30	30	30	35
			4	50	55	55	60	60	60	55	60	55
			5	0	10	15	10	10	10	15	10	10

Table 4.5 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
REP	Western pond turtle	EEIS BLM/FS	1	40	10	0	20	20	20	0	20	20
			2	30	30	30	40	40	40	30	40	40
			3	30	50	50	40	40	40	50	40	40
			4	0	10	10	0	0	0	20	0	0
			5	0	0	10	0	0	0	0	0	0
		EEIS CumEff	1	40	0	0	0	0	0	0	0	0
			2	30	0	0	0	0	0	0	0	0
			3	30	10	0	10	10	10	0	10	10
			4	0	20	10	20	20	20	10	20	20
			5	0	70	90	70	70	70	90	70	70

[1]Group: AMP - amphibian; REP -reptile.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[4]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[5]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

Spotted frog species B. The taxonomy of the spotted frog is uncertain. Green and others (1996) conducted a genetic study on spotted frog populations throughout the species' range. Although they did not name any new species, evidence indicates that the spotted frog is really a complex of species and that at least the western part of the range is populated by a species distinct from populations in the eastern part of the range. We are calling the western species "spotted frog species A" and the eastern species "spotted frog species B" for purposes of this analysis. Spotted frog species A is only known from western Oregon to southwestern Washington. In western Oregon, it is found at Gold Lake, Paulina Lake, Crane Prairie Reservoir, and Klamath Forest Refuge. In southwestern Washington, it has been documented at Conboy Lake and Trout Lake (Green and others 1996). The general range of spotted frog species B within the Basin includes patches within the Northern Great Basin and Owyhee Uplands Provinces, within central Oregon, the Blue Mountains, northeastern Washington, the northern two-thirds of Idaho, northwestern Montana, and northwestern Wyoming. Some populations in southwestern Idaho, southeastern Oregon, and northern Nevada are listed by the USFWS as C1 Candidate species (Green and others 1996). Populations of species B in this area are isolated at high altitudes or in desert springs and have been subject to restricted gene flow between populations and, consequently, high inbreeding within populations. Licht (1986) reported that spotted frogs were rarely found more than one meter away from water and were normally found floating in aquatic vegetation. Munger and others (1995), in southwestern Idaho, found spotted frogs between 1,500 and 1,900 meters elevation in oxbows, pools or ponds with sandy substrate, and in surrounding areas with low amounts of sagebrush cover. Data collected at the point of capture indicated that spotted frog microhabitat tended to contain higher amounts of sandy substrate,

submerged vegetation, and algae and lower amounts of grass, sagebrush, and rock substrate. Even temporary water is used for breeding. The main population of spotted frog species B is doing well and can improve with riparian habitat improvement. The bulk of the population in the UCRB EIS area is still intact and breeding is occurring in a variety of areas. Isolation of some populations is severe in some EEIS areas. There are documented cases of extirpation of some local populations in Oregon and fragmentation of populations and habitat due to past activities.

We focused on riparian standards and grazing intensity in assessing effects of alternatives on habitat on Federal lands. Historic outcomes were somewhat uncertain, with likelihood points distributed across all five outcomes within the EEIS area (table 4.5). Under current conditions within the EEIS area, there are no likelihood points in Outcomes 1 or 2. This habitat decline is projected to continue under Alternatives 1 and 5 (the majority of likelihood points are in Outcomes 4 and 5). Alternatives 2, 3, 4, 6, and 7 would increase or maintain habitat conditions relative to current. Within the UCRB EIS area, the decline in habitat from historic to current is less extreme than in the EEIS area (the majority of likelihood points for historic conditions is in Outcome 2 or higher and, under current conditions, in Outcome 3 or higher). Alternatives 1 and 5 are projected to result in continued decline from current conditions on the UCRB EIS area. Alternatives 2, 3, 4, 6, and 7 are projected to maintain current levels. Cumulative effects results were similar to outcomes for habitat on Federal lands.

Spotted frog species A. Because of similar habitat associations, our assessment for this species parallels that of spotted frog species B. Species A is found only in the EEIS area. Outcomes within the EEIS area are similar to those described for species B in the EEIS area.

Northern leopard frog. The range of the northern leopard frog is scattered throughout the five states in the ICBEMP assessment area. The range map indicates sites in the Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, Columbia Plateau, Owyhee Uplands, Upper Snake, and Snake Headwaters Ecological Reporting Units. There is little overlap of the northern leopard frogs' range with Federal land in the EEIS area. Information is lacking on historic range and populations. However, population declines have been noted throughout the western United States (Blaustein and others 1994, Carey 1993, Corn and Fogleman 1984, Cousineau and Rogers 1991, Hammerson 1982). Most populations have likely been eliminated in Oregon and Washington, except in the Columbia River Gorge and the potholes area in Washington. Northern leopard frogs may also have been eliminated from most of the UCRB EIS area. This species is found in still water and pond habitats deep enough to have some open water, which is often warm. Panelists indicated that population levels fluctuate widely over a large area, and with isolated populations the effect is compounded, causing local extirpation. The current isolation of populations limits resilience and the ability to recolonize. Even pristine areas have lost populations.

Jennings and Hayes (1994) stated that this species requires tall, dense grass bordering aquatic habitats. Past grazing practices have reduced habitat through removal of pond bank vegetation and have altered pond hydrology. We considered grazing intensity as an important factor in evaluating the effects of the preliminary draft EIS alternatives on federally administered habitat. The outcomes for the northern leopard frog indicate large habitat shifts from historic to current conditions, to more isolation and less population interaction across both planning areas. The spread of points across four or more outcomes under historic conditions suggests some uncertainty about the historic distribution of this species across the Federal lands (appendix 4-D). Further isolation and fragmentation are projected under Alternatives 1, 3, and 5 (table 4.5). Alternatives 2, 4, 6, and 7 would tend to maintain current habitat conditions for this species. All alternatives have high likelihoods (30 to 95 likelihood points) of Outcome 5

(scarce habitat, little or no population interactions, strong potential for extirpations, and little likelihood of recolonization). Similar and more extreme cumulative effect trends have resulted in severe population declines within the Basin. We projected 67 percent or higher likelihood that species populations met Outcome 3 or higher historically, whereas current populations have 63 percent or higher likelihood of Outcome 5 within EEIS and UCRB EIS areas. Populations under all preliminary draft EIS alternatives are projected at 85 percent or higher likelihood of Outcome 5 across the Basin.

Reptiles—Results for habitat on BLM- and FS-administered lands were generally similar for five rangeland-associated reptiles (desert horned lizard, sagebrush lizard, short-horned lizard, night snake, and striped whipsnake), indicating that current habitat on these lands has declined only slightly from the historic range of conditions. The effects on habitat also do not vary greatly by alternative for these five species (table 4.6 and fig. 4.13). These species were historically either broadly distributed (Outcome 1), or distributed with gaps as in Outcome 2. Cumulative effects on populations of these five species generally trend toward more isolated populations, though among these five species, only the outcome rating for the striped whipsnake in the UCRB EIS area has any points in Outcome 5 (table 4.5). These five reptiles are not further addressed.

Results for other reptiles suggest a greater decline from historic habitat conditions (tables 4.5 and 4.6, and figs. 4.13 and 4.15) for some rangeland-associated species on BLM- and FS-administered lands (Mojave black-collared lizard, longnose leopard lizard, rubber boa, and sharptail snake). These declines are generally related to past conversion of rangeland to agricultural use or non-native plant introductions.

Painted turtle. The range of the painted turtle within the Basin includes the Columbia River Gorge, northern Oregon, Washington east of the Cascades, northern Idaho, and northwestern Montana. The painted turtle uses wetlands, ponds, and slow moving streams at lower elevations. Most of its habitat is likely on private land. Painted turtles nest some distance away from ponds.

Riparian buffers and wetland protection were the primary factors we considered in evaluating the effects of alternatives on habitat on federally administered lands. The outcomes for the painted turtle did not vary strongly from historic to current or under Alternatives 2, 3, 4, 6, and 7 (tables 4.5 and 4.6). Alternatives 1 and 5 were projected to result in more isolated habitat. Larger riparian buffers under Alternatives 2, 3, 4, 6, and 7 would likely conserve habitat on Federal land by encompassing nesting sites, adjusting grazing regimes, and providing dead trees in ponds for basking. The cumulative effects on populations also follow the pattern for the Federal habitat assessment, with some risk of extirpation noted for Alternatives 1, 2, 3, and 5 in each EIS area. Panelists suspect populations are declining, partly as a result of factors not greatly influenced by the alternatives. Pesticide accumulations, private land modification, and skunk predation were noted as specific factors contributing to population declines.

Western pond turtle. The western pond turtle is known to persist in the Klamath Lake region in Oregon and the Columbia River Gorge near The Dalles, Oregon, within the Basin. The western pond turtle does not occur in the UCRB EIS area. Nussbaum and others (1983) reported that western pond turtles inhabit marshes, sloughs, moderately deep ponds, and slow-moving portions of creeks and rivers from sea level to about 1,830 meters elevation. They require basking sites, such as, partially submerged logs, vegetation mats, rocks, and mud banks. The majority of nesting sites are within 200 meters of the aquatic habitat, but may be as much as 402 meters away. Many populations show an increasing bias toward older individuals, indicating that little or no recruitment is taking place. Disturbance of nest sites by cattle and agricultural practices is believed to have eliminated reproduction in many populations (Jennings and Hayes 1994).

Riparian buffers and wetland protection were the primary factors considered in evaluating the effects of alternatives on habitat on federally administered land. The outcomes for the western pond turtle have been reduced from historic to current from 70 percent in Outcomes 1 and 2 to 80 percent in Outcomes 2 and 3. Alternatives 2, 3, 4, 6, and 7 (table 4.5) would result in higher likelihoods in Outcome 2 than current. Alternatives 1 and 5 would result in further isolation of habitat. Larger riparian buffers under Alternatives 2, 3, 4, 6, and 7 would likely conserve habitat on Federal land by encompassing nesting sites, adjusting grazing regimes, and providing dead trees in ponds for basking. The cumulative effects on populations also follows the general pattern for the Federal habitat assessment, but with higher risks of extirpation noted under all alternatives. The available evidence suggests that populations are declining for reasons not strongly influenced by the alternatives and Federal land management. The extensive habitat loss from historic conditions in the former range (mainly outside the assessment area), predation by non-native species, and continued loss of habitat on private land (especially in the Willamette Valley) contribute to the expected continued decline.

Mojave black-collared lizard. The range of the Mojave black-collared lizard within the Basin includes northern Nevada, southeastern Oregon near the Snake River and Owyhee Reservoir in southeastern Oregon, southwestern Idaho, and near Idaho Falls, Idaho. The majority of the range is on BLM-administered land. Distribution within this area is generally discontinuous (Axtell 1972). Whitaker and Maser (1981) reported that collared lizards inhabit talus in areas of low, sparse vegetation and that talus is the main habitat component. Rock outcrops and sparse vegetation are important habitat for dispersal (Sanborn and Loomis 1979).

The evaluation of habitat in southeastern Oregon and southwestern Idaho of the Mojave black-collared lizard is displayed in the ratings for the UCRB EIS area ratings (table 4.5). Within this area, habitat has become more fragmented from historic to current due to habitat loss associated with agriculture, non-native vegetation invasion, and reservoir development. Further decline of habitat on BLM-administered lands is projected under Alternatives 1 and 5 due to invasion of non-native plants. Other alternatives were projected to maintain current conditions. The cumulative effects assessment projected a historic decline in populations of the Mojave black-collared lizard (table 4.5). Further decline is projected under Alternatives 1 and 5 (tending toward more isolated populations), whereas Alternatives 2, 3, 4, 6, and 7 are expected to retain populations similar to current. Declines would result from additional conversion of native vegetation to non-native species on Federal and non-Federal land. This species is also very susceptible to population reduction as a result of commercial collection for the pet trade.

Longnose leopard lizard. The range of the longnose leopard lizard in the Basin includes rangelands in southeastern Oregon, southwestern Idaho, two areas north and south of Idaho Falls, and two small sites near the Columbia River in northern Oregon. Federal lands (primarily those administered by the BLM) constitute about 40 percent of the species range in the Basin. The longnose leopard lizard generally inhabits sandy, desert shrub areas (Nussbaum and others 1983). They are especially common in the islands of sand that accumulate around scattered greasewood shrubs. Whitaker and Maser (1981) studied leopard lizards in a shrub-steppe community of the Owyhee Upland Province. They reported that leopard lizards are widely distributed in southeastern Oregon, in Wyoming big sagebrush/bunchgrass, and in black greasewood/grass and shadescale saltbush/bunchgrass communities. The species tends to occupy areas with sparse vegetation.

Table 4.6. Mean viability outcomes for habitat and populations of amphibians and reptiles for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

			Period / Alternative[3]								
Group[1]	Species Name	Area[2]	H	C	A1	A2	A3	A4	A5	A6	A7
AMP	Coeur d'Alene salamander	UCRB BLM/FS[4]	3.7	4.3	4.6	4.3	4.3	4.2	4.6	4.2	4.1
		UCRB CumEff	3.7	4.4	4.9	4.8	4.8	4.7	4.9	4.7	4.5
AMP	Spotted frog species B	EEIS BLM/FS	2.5	3.5	3.9	3.5	3.5	3.5	3.9	3.5	3.4
		EEIS CumEff	2.5	3.5	4.0	3.6	3.6	3.6	3.9	3.6	3.5
		UCRB BLM/FS	2.1	3.1	3.6	3.1	3.2	3.1	3.5	3.1	3.0
		UCRB CumEff	2.1	3.1	3.7[5]	3.2	3.2	3.2	3.6[5]	3.2	3.1
AMP	Northern leopard frog	EEIS BLM/FS[4]	3.2	4.5	4.7	4.5	4.6	4.4	4.7	4.4	4.3
		EEIS CumEff	3.2	4.5	5.0[5]	5.0	5.0	4.9	5.0[5]	4.9	4.9
		UCRB BLM/FS[4]	2.9	4.7	4.9	4.5	4.6	4.3	4.7	4.2[5]	3.9[5]
		UCRB CumEff	2.9	4.8	5.0	5.0	5.0	5.0	5.0	5.0	4.9
AMP	Spotted frog species A	EEIS BLM/FS[4]	2.5	3.6	4.1	3.6	3.6	3.4	4.0	3.3	3.1[5]
		EEIS CumEff	2.5	3.6	4.1	3.7	3.7	3.7	4.0	3.7	3.6
AMP	Tailed frog	EEIS BLM/FS	2.8	3.2	4.1[5]	3.2	3.4	3.2	4.0[5]	3.2	3.0
		EEIS CumEff	2.8	3.2	4.6[5]	3.7	4.0[5]	3.8[5]	4.5[5]	3.8[5]	3.6
		UCRB BLM/FS	2.8	3.2	4.0[5]	3.1	3.3	3.2	3.9[5]	3.1	3.0
		UCRB CumEff	2.8	3.2	4.2[5]	3.6	3.7[5]	3.6	4.2[5]	3.6	3.5
AMP	Western toad	EEIS BLM/FS	1.8	2.4	3.4[5]	2.2	2.3	2.2	3.4[5]	2.2	2.0
		EEIS CumEff	1.8	3.3	4.4[5]	3.4	3.4	3.4	4.3[5]	3.4	3.3
		UCRB BLM/FS	2.1	2.6	3.5[5]	2.6	2.6	2.6	3.5[5]	2.6	2.5
		UCRB CumEff	2.1	3.4	4.2[5]	3.6	3.6	3.6	4.3[5]	3.6	3.5
AMP	Woodhouse's toad	EEIS BLM/FS[4]	2.5	3.9	4.5[5]	4.0	4.1	3.7	4.4[5]	3.5	3.4
		EEIS CumEff	2.5	3.9	4.7[5]	4.6[5]	4.6[5]	4.5[5]	4.7[5]	4.5[5]	4.5[5]
		UCRB BLM/FS[4]	3.0	3.8	4.4[5]	4.0	4.1	3.7	4.4[5]	3.5	3.4
		UCRB CumEff	3.0	3.8	4.7[5]	4.7[5]	4.7[5]	4.6[5]	4.7[5]	4.6[5]	4.6[5]
REP	Common garter snake	EEIS BLM/FS	1.5	2.5	3.5[5]	2.5	2.5	2.5	3.5[5]	2.5	2.5
		EEIS CumEff	1.5	3.5	4.5[5]	3.5	3.5	3.5	4.5[5]	3.5	3.5
		UCRB BLM/FS	1.5	2.6	3.2[5]	2.6	2.6	2.6	3.2[5]	2.6	2.6
		UCRB CumEff	1.5	3.1	3.7[5]	3.2	3.2	3.2	3.7[5]	3.2	3.1
REP	Desert horned lizard	EEIS BLM/FS	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5
		EEIS CumEff	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5
		UCRB BLM/FS	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5
		UCRB CumEff	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5
REP	Longnose leopard lizard	EEIS BLM/FS	3.5	3.8	4.0	3.8	3.8	3.8	4.0	3.8	3.8
		EEIS CumEff	3.5	3.9	4.1	3.9	3.9	3.9	4.1	3.9	3.8
		UCRB BLM/FS	3.5	3.8	4.0	3.8	3.8	3.8	4.0	3.8	3.8
		UCRB CumEff	3.5	3.9	4.1	3.9	3.9	3.9	4.1	3.9	3.8
REP	Mojave black-collared lizard	UCRB BLM/FS	3.5	3.8	4.0	3.8	3.8	3.8	4.0	3.8	3.8
		UCRB CumEff	3.8	3.8	4.2	3.9	3.9	3.9	4.2	3.9	3.8
REP	Night snake	EEIS BLM/FS	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
		EEIS CumEff	1.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
		UCRB BLM/FS	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5
		UCRB CumEff	1.5	1.6	1.7	1.6	1.6	1.6	1.7	1.6	1.6

Table 4.6 (continued)

			Period / Alternative[3]								
Group[1]	Species Name	Area[2]	H	C	A1	A2	A3	A4	A5	A6	A7
REP	Painted turtle	EEIS BLM/FS	2.4	2.7	3.2[5]	2.9	2.9	2.6	3.2[5]	2.6	2.4
		EEIS CumEff	2.4	3.3	3.9[5]	3.5	3.5	3.2	3.9[5]	3.2	3.2
		UCRB BLM/FS	2.5	2.7	3.1[5]	2.9	2.9	2.6	3.1[5]	2.6	2.5
		UCRB CumEff	2.5	3.4	3.9[5]	3.6	3.7	3.4	3.9[5]	3.3	3.2
REP	Rubber boa	EEIS BLM/FS	2.5	3.5	3.9	3.5	3.5	3.3	3.9	3.3	2.9[5]
		EEIS CumEff	2.5	3.5	4.9[5]	4.5[5]	4.5[5]	4.3[5]	4.9[5]	4.3[5]	3.9
		UCRB BLM/FS	3.0	3.6	3.8	3.6	3.6	3.5	3.8	3.5	3.2
		UCRB CumEff	3.0	3.6	4.3[5]	4.1	4.1	4.0	4.3[5]	4.0	3.8
REP	Sagebrush lizard	EEIS BLM/FS	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
		EEIS CumEff	1.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
		UCRB BLM/FS	1.5	1.6	1.7	1.6	1.6	1.6	1.7	1.6	1.6
		UCRB CumEff	1.5	2.0	2.3	2.1	2.1	2.1	2.2	2.1	2.0
REP	Sharptail snake	EEIS BLM/FS[4]	3.5	4.5	4.7	4.5	4.5	4.4	4.6	4.2	3.9[5]
		EEIS CumEff	3.5	4.5	5.0[5]	4.9	4.9	4.9	5.0[5]	4.9	4.5
REP	Short-horned lizard	EEIS BLM/FS	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
		EEIS CumEff	1.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
		UCRB BLM/FS	1.5	1.6	1.7	1.6	1.6	1.6	1.7	1.6	1.6
		UCRB CumEff	1.5	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.6
REP	Striped whipsnake	EEIS BLM/FS	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
		EEIS CumEff	1.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
		UCRB BLM/FS	3.5	3.8	3.9	3.8	3.8	3.8	3.9	3.8	3.7
		UCRB CumEff	3.5	3.8	3.9	3.8	3.8	3.8	3.9	3.8	3.8
REP	Western pond turtle	EEIS BLM/FS	1.9	2.6	3.0	2.2	2.2	2.2	2.9	2.2	2.2
		EEIS CumEff	1.9	4.6	4.9	4.6	4.6	4.6	4.9	4.6	4.6

[1]Group: AMP - amphibian; REP - reptile

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[4]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

[5]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table may be misleading.

The Federal habitat assessments for each EIS area were similar. Within each EIS area, the habitat has become more fragmented from historic to current due to habitat loss associated with agriculture, non-native vegetation invasion, and reservoir development (table 4.5). The primary factor considered in ratings was conversion of native vegetation to non-native species. Further decline in habitat on BLM-administered land is projected under Alternatives 1 and 5. Other alternatives are expected to maintain current conditions. There is some likelihood of Outcome 5 under each alternative (scarce habitat with little interaction among populations and strong potential of extirpation). Results of cumulative effects assessments were similar to those of the Federal habitat assessment.

Rubber boa. The range of the rubber boa within the Basin encompasses most of the assessment area with the exception of south central Washington and north central Oregon. Panelists suggest it is common where found, but is distributed in scattered locations.

Fragmentation and connectivity of rubber boa habitat was the primary factor considered in evaluating outcomes of preliminary draft EIS alternatives. The outcomes for habitation on Federal land for each EIS area were similar. Within each EIS area, the habitat became more fragmented from historic to current due to habitat loss associated with agriculture, invasions of non-native vegetation, loss of riparian vegetation, and reservoir development (table 4.5). Further decline of habitat on BLM-administered land is projected under Alternatives 1 and 5. Other alternatives would be expected to maintain or improve habitat from current conditions. There was no likelihood of Outcome 5 under any alternative. Results of cumulative effects assessments were similar to those of the Federal habitat assessments, but with likelihoods of Outcome 5 ranging from 10 to 90 percent under the alternatives (highly isolated populations with little or no possibility of interactions and strong potential of extirpations).

Common garter snake. The range of the common garter snake encompasses the Basin. It is most frequently associated with riparian vegetation and wetter forested areas.

Federal habitat assessments, and cumulative effect assessments parallel the general outcomes for amphibians and riparian-associated reptiles discussed above (table 4.5). Alternatives 2, 3, 4, 6, and 7 are projected to generally maintain current habitat conditions, whereas Alternatives 1 and 5 are projected to result in a decline in riparian habitat from current conditions. Alternatives 1 and 5 have 25 (UCRB EIS) or 50 (EEIS EIS) likelihood points in Outcome 5 (scarce habitat with little interaction among populations and strong potential of extirpation).

Sharptail snake. Within the Basin, the sharptail snake is known from two isolated locations in the EEIS area. One site is from central Washington, near Yakima, and the other location is on both sides of the Columbia River Gorge, near The Dalles, Oregon. Sharptail snakes occupy moist habitats, rotting logs, oak woods, riparian woodlands, and stable talus. The species may be undergoing continued declines resulting from increasing isolation associated with long-term global climate change.

Historically, the sharptail snake was found in a patchy or isolated distribution (table 4.5). Under current conditions and under all preliminary draft EIS alternatives, the sharptail snake habitat is very isolated and there is a high likelihood of Outcome 5 (scarce habitat with little interaction among populations and strong potential of extirpation). Somewhat higher outcomes for Alternative 7 are predicted as some reserves fall within range of the sharptail snake. Cumulative effects of increased urbanization and agriculture would result in high likelihoods of extirpation of populations within the Basin.

Birds

One hundred and thirty-three bird species were assessed in four separate expert panels. Information derived from those panels was the basis for the assessment discussed below.

Waterbirds and Shorebirds

Introduction—Fifty-six waterbirds and shorebirds initially were selected for evaluation from 102 bird species associated with wetlands and streams in the assessment area. One species is a federally endangered species (whooping crane), six species are listed as Federal C2 Candidate species, and seven species are on sensitive species lists. The remaining species have had habitat decline historically, or habitat might decline under one or more proposed alternatives.

Methods—The waterbird and shorebird panel altered that initial list. Eleven species were not analyzed further or were recommended for fine-scale analysis based on peripheral, common, or insignificant distributions within the assessment area. The whooping crane was removed from the list because only a few individuals remain in experimental populations within the Basin.[11]

[11]Personal communication. March 7, 1996. G. Ivey, wildlife biologist, Malheur National Wildlife Refuge, Princeton, OR. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

Mountain plover, a sensitive species, was considered to have an insignificant distribution in the Basin. Another sensitive species, the yellow rail, was designated for fine-scale analysis.

Twenty species were added to the list of which 19 were designated for evaluation by the panel and one (Caspian tern) was designated for fine-scale analysis. Several species of grebes, the dabbling and diving ducks, two species of herons, and two species of sandpipers were added because of concerns for loss of wetland habitats, past population declines, and susceptibility to land use, disturbance, or contaminants. In the final analysis, historical, current, and future outcomes under the alternatives were judged for 65 species of waterbirds and shorebirds. A complete list of waterbirds and shorebirds and their final designation for analysis is provided in appendix 4-C.

The relatively large number of species that were evaluated and the similarity of habitats used by these species prompted the panel to group species. Panelists first listed nine primary wetland types and other habitat features (such as, snags, trees for nesting) used by one or more of the listed species (table 4.7). For each species, a list was made of those habitats considered primary for the species. Species then were grouped by similar combinations of habitats. Some groups were composed of only one species, whereas others had several members. Inclusion of species in a particular group did not preclude their use of other wetland types as secondary habitat. Waterbirds and shorebirds that breed or winter in the assessment area comprised 14 groups. Migrant shorebirds formed an additional group (table 4.8). The outcomes of each management alternative were determined for the groups as a whole with comments on individual species recorded as appropriate.

Results—No groups of waterbirds and shorebirds were judged to have been widely distributed (Outcome 1) historically, nor to be widely distributed currently or under any of the alternatives (tables 4.9 and 4.10, fig. 4.16). Most groups had historically patchy distributions as described by Outcomes 3 or 4. Current conditions are somewhat poorer than they were historically, resulting in more groups classified in Outcome 4 and 5, and mean outcomes about 0.5 units lower than historical conditions. Under most alternatives, the mean outcome for all groups combined changed little (< 0.5 units) from the current conditions (fig. 4.17). However, the outcomes under Alternatives 4 and 6 would be better than current conditions for wood duck, mergansers, and harlequin ducks, nearly approaching or exceeding historical conditions (tables 4.9 and 4.10). Outcomes for the EEIS and UCRB planning areas were largely similar, and outcomes under the cumulative effects analysis generally differed little from those for BLM- and FS-administered lands.

Two species were judged as Outcome 5 under one or more alternatives (tables 4.9 and 4.10). Historical habitats and populations of upland sandpiper were broadly distributed approximately as Outcome 2, but loss of grassland habitats and over-hunting have resulted in current and projected isolated habitat patches and populations distributed as Outcome 5 (table 4.9). Habitat on BLM- and FS-administered lands for upland sandpipers would increase slightly under Alternatives 4 and 6, but significant (>0.5 outcomes) improvements in outcome will remain problematic because of currently disjunct and degraded habitat and populations.

Harlequin duck habitat and populations were judged patchy and isolated for Outcome 5 under current conditions and for Alternatives 1 and 5. Significant improvement in harlequin duck outcome (to about mean Outcome 3.5) was predicted under Alternatives 4 and 6 as a result of watershed restoration that improved water quality, reduced streamside disturbance and corvid predation (often associated with human use), and protected and restored riparian vegetation. Harlequin duck was the only waterbird species that showed a significant improvement from current conditions under any alternative (table 4.9). No other individual species or species group was projected to experience significant declines or improvements under any of the alternatives.

Table 4.7. Wetland types and other habitat features used to group breeding and migrant waterbirds and shorebirds for evaluation of ICBEMP management alternatives.

- Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation.
- Permanent, shallow wetlands (such as, springs).
- Seasonal wetlands, flooded winter and spring, dry up in late summer.
- Alkali wetlands.
- Temporary open water (for example, meltwater pools, flooded pasture).
- Tree cavities for nesting.
- Upland grassland, primarily for nesting.
- Tree nesting (non-cavity).
- Rivers and stream riparian, wooded waters.

Discussion—Projected outcomes for the waterbirds and shorebirds as a whole changed very little because alternatives had little planned manipulation of wetland habitat area. Moreover, available projections of wetland and stream riparian habitat areas were poorly modeled for alternatives because of the coarse resolution used to map habitat change under the alternatives and the fine grain (small area relative to the mapping resolution) of the habitats. The panel assumed that wetlands did not change in area on BLM- or FS-administered lands under the alternatives except for natural fluctuations due to the hydrological cycle. Thus, panelists assessed the quality of wetland habitats in assessing viability outcomes. Panel judgments of the effects of alternatives were made largely on the basis of objectives, standards, and guidelines presented in the EIS for management of lentic and lotic riparian vegetation, snags, grazing management, and fire management in riparian areas.

Alternatives with the best outcomes (improved on current conditions) were judged most successful in increasing water quality in streams, maintaining herbaceous and woody riparian vegetation through management of natural and human disturbance, increasing snags in riparian areas and adjacent uplands for cavity nesters, and maintaining flexibility in managing grazing of upland grasslands to reduce negative effects (for example, on upland breeding species such as dabbling ducks) or create positive effects (such as, for cranes, snipe, rails). The best alternatives were not necessarily the most restrictive (for example, Alternative 7), but ones that allowed flexibility in restoration activities.

Panelists described the critical influence of natural fluctuations in wetland area over time on the dynamics and viability of waterbird and shorebird populations. Wetland expansion during wet years results in high production to compensate for drought years. Management needs to recognize the importance of such ephemeral wetlands whether they are on the margin of perennial wetlands or are separate areas that may not be wet every year. For example, mudflats in flooded fields or as part of larger wetlands with fluctuating water levels are considered a key habitat for breeding and migrant sandpipers. Small (<1 acre) wetlands are also vital habitats that are increasingly being converted to other land uses, such as agriculture, or are being degraded by inadequate management of livestock grazing. Such small wetlands are important habitats for grebes and other open water species, herons and egrets, dabbling ducks, cranes, rails, and shorebirds.

Table 4.8. Waterbird and shorebird groups for evaluation of the ICBEMP management alternatives and their associated wetland types, upland habitats, and microhabitats. Groups 1 through 15 are primarily breeding species. Group 15 is only migrant species.

Group 1.	Open water group. Clark's grebe, Red-necked grebe, Western grebe, White pelican, Canvasback, Lesser scaup, Redhead, Ring-necked duck, Ruddy duck, Trumpeter swan, American bittern, Western least bittern, Black tern, California gull, Forster's tern, Ring-billed gull. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Seasonal wetlands, flooded winter and spring, dry up in late summer.
Group 2.	Common loon. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation.
Group 3.	Wood duck, Common merganser, Hooded merganser. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Tree cavities for nesting. Rivers and stream riparian, wooded waters.
Group 4.	Common goldeneye, Barrow's goldeneye, Bufflehead. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Tree cavities for nesting.
Group 5.	Snowy plover. Alkali wetlands.
Group 6.	Harlequin duck. Rivers and stream riparian, wooded waters.
Group 7.	Herons and egrets. Black-crowned night heron, Great blue heron, Great egret, Snowy egret, White-faced ibis. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Seasonal wetlands, flooded winter and spring, dry up in late summer. Tree nesting (non-cavity).
Group 8.	Dabbling ducks. Blue-winged teal, Cinnamon teal, Gadwall, Green-winged teal, Mallard, Pintail, Shoveler, American widgeon. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Seasonal wetlands, flooded winter and spring, dry up in late summer. Upland grassland, primarily for nesting.
Group 9.	Spotted sandpiper. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Seasonal wetlands, flooded winter and spring, dry up in late summer. Rivers and stream riparian, wooded waters.
Group 10.	Sandhill crane. Permanent, shallow wetlands (such as, springs). Seasonal wetlands, flooded winter and spring, dry up in late summer. Rivers and stream riparian, wooded waters.
Group 11.	Sora rail, Virginia rail, American avocet, Black-necked stilt, Wilson's phalarope. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Permanent, shallow wetlands (such as, springs). Seasonal wetlands, flooded winter and spring, dry up in late summer.
Group 12.	Long-billed curlew, Willet. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Permanent, shallow wetlands (such as, springs). Seasonal wetlands, flooded winter and spring, dry up in late summer. Upland grassland, primarily for nesting.
Group 13.	Upland sandpiper. Upland grassland, primarily for nesting.
Group 14.	Common snipe. Permanent, shallow wetlands (such as, springs).
Group 15.	Migrant sandpipers: Baird's sandpiper, Black-bellied plover, Dunlin, Greater yellowlegs, Least sandpiper, Lesser yellowlegs, Long-billed dowitcher, Marbled godwit, Pectoral sandpiper, Red-necked phalarope, Sanderling, Semi-palmated plover, Semi-palmated sandpiper, Western sandpiper. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Permanent, shallow wetlands (such as, springs). Seasonal wetlands, flooded winter and spring, dry up in late summer. Alkali wetlands. Temporary open water (for example, meltwater pools, flooded pasture).

Management of herbaceous and woody riparian vegetation, and adjacent upland grassland habitats around small and large wetlands is key to maintaining the proper functioning condition of wetlands for waterbirds. Restoration and management of fire were considered essential to the success of some alternatives in setting back succession to early stages, for example, to increase habitat for rails. Disturbance can have both good and bad effects, depending on the species, and needs to be managed with careful consideration of local habitat conditions and species of interest. Fire may destroy key woody vegetation used for nesting by herons, egrets, and ibis, and snags used for nesting by wood ducks, mergansers, and goldeneyes. Likewise, grazing upland grassland adjacent to wetlands can be detrimental to nesting dabbling ducks. However, short grass associated with grazing can be beneficial to cranes, snipe, curlews, and some species of rails at other times of the year.

Little difference between outcomes for BLM- and FS-administered lands and cumulative effects initially may seem counter-intuitive considering the great extent of wetlands on other Federal and private lands. The positive effects of greater habitat area, in many cases, were offset by negative, non-habitat factors, such as the accumulation of pesticides and other toxic substances in wetlands, degradation of wetlands on private lands in the assessment area, degradation of wintering grounds and population declines south of the United States, and urban and industrial development, pollution, and human activities in marine wintering environments.

Figure 4.16 Waterbirds and Shorebirds

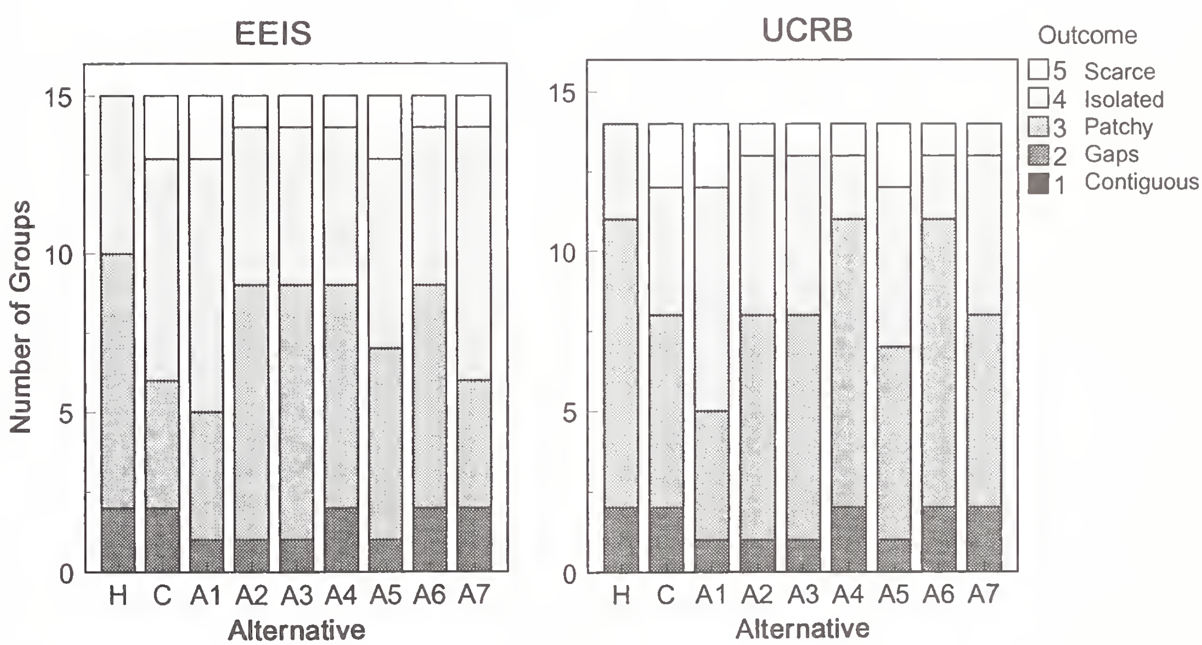

Figure 4.16. Frequency distribution of mean habitat outcome scores for 15 groups of waterbird species on Federal lands in the EEIS planning area and 14 groups in the UCRB planning area for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.17 Waterbirds and Shorebirds

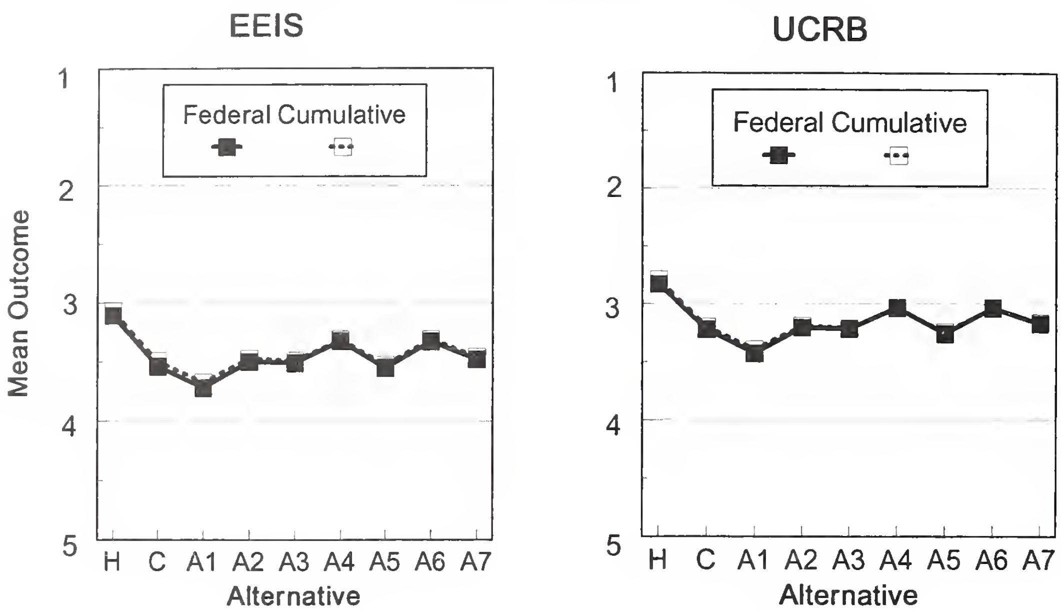

Figure 4.17. Mean outcome scores averaged over 15 groups of waterbird species in the EEIS planning area and 14 groups in the UCRB planning area for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.18 Waterbirds and Shorebirds

Change from Current to Future

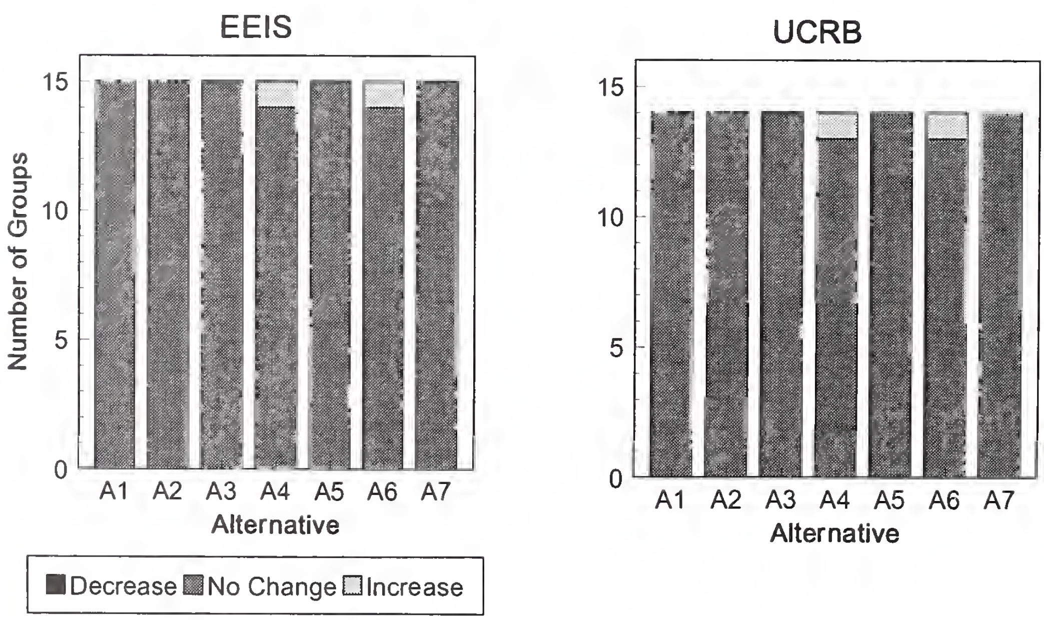

Figure 4.18. Departure of habitat outcomes on Federal lands from current conditions under each alternative for 15 groups of waterbird species in the EEIS planning area and 14 groups in the UCRB planning area. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

Table 4.9. Mean likelihood scores of viability outcomes for habitat and species groups of waterbirds and shorebirds for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means were calculated from the individual likelihood scores of panelists.

			Period / Alternative[3]								
Habitat & Species Groups	Area[1]	Outcome[2]	H	C	A1	A2	A3	A4	A5	A6	A7
Group 1: Open water birds	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	7	2	0	3	3	7	0	7	1
		3	91	46	37	51	51	65	51	65	53
		4	2	46	48	42	42	24	44	24	41
		5	0	6	15	4	4	4	5	4	5
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	2	3	0	4	4	9	1	9	2
		3	90	51	43	49	49	59	47	59	53
		4	8	38	44	42	43	28	50	28	40
		5	0	8	13	5	4	4	2	4	5
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	2	1	0	3	3	6	0	6	2
		3	80	61	36	58	58	67	54	67	65
		4	18	28	48	37	37	22	34	22	31
		5	0	10	16	2	2	5	12	5	2
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	4	6	2	4	4	12	4	12	4
		3	78	59	38	57	55	60	55	60	61
		4	18	27	46	37	39	24	32	24	33
		5	0	8	14	2	2	4	9	4	2
Group 2: Common loon	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	4	4	4	4	4	4
		3	26	39	28	36	36	40	36	40	36
		4	74	61	60	60	60	56	60	56	60
		5	0	0	12	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	6	16	10	16	16	16	16	16	16
		3	36	40	34	40	41	41	40	43	40
		4	58	44	46	44	43	43	44	41	44
		5	0	0	10	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	4	4	4	4	4	4
		3	18	45	34	42	42	44	42	44	42
		4	82	55	54	54	54	52	54	52	54
		5	0	0	12	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	16	14	16	16	16	16	16	16
		3	37	35	24	33	33	34	34	34	33
		4	63	49	49	51	51	50	50	50	51
		5	0	0	13	0	0	0	0	0	0
Group 3: Wood duck, mergansers	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	2	12	6	14	12	25	11	25	15
		3	40	36	36	38	37	42	38	42	41
		4	58	42	42	42	43	29	40	29	38
		5	0	10	16	6	8	4	11	4	6

Table 4.9 (continued)

Habitat & Species Groups	Area[1]	Outcome[2]	H	C	A1	A2	A3	A4	A5	A6	A7
			Period / Alternative[3]								
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	1	9	5	11	10	22	9	22	13
		3	36	34	33	38	37	41	38	43	41
		4	63	46	39	45	44	33	41	31	40
		5	0	11	23	6	9	4	12	4	6
	UCRB BLM/FS	1	0	5	2	4	4	6	4	6	5
		2	16	23	18	24	21	29	22	29	27
		3	74	45	38	38	39	46	42	46	43
		4	10	19	28	23	26	15	24	15	19
		5	0	8	14	11	10	4	8	4	6
	UCRB CumEff	1	0	6	5	6	6	6	6	6	6
		2	16	18	15	18	18	23	17	24	22
		3	72	44	30	37	37	51	40	50	42
		4	12	24	31	21	22	17	22	17	18
		5	0	8	19	18	17	3	15	3	12
Group 4: Goldeneyes	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	40	24	10	31	26	44	23	44	30
		4	60	70	61	62	63	54	70	54	64
		5	0	6	29	7	11	2	7	2	6
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	41	30	15	31	25	42	22	42	29
		4	59	65	65	59	55	56	67	56	65
		5	0	5	20	10	20	2	11	2	6
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	34	12	40	33	53	32	53	38
		4	50	62	65	55	56	43	63	43	60
		5	0	4	23	5	11	4	5	4	2
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	51	30	15	34	28	46	27	48	36
		4	49	63	64	59	55	50	64	48	62
		5	0	7	21	7	17	4	9	4	2
Group 5: Western snowy plover	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	0	0	0	0	0
		4	100	100	88	97	97	97	90	97	100
		5	0	0	12	3	3	3	10	3	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	0	0	0	0	0
		4	100	90	82	90	90	90	83	90	90
		5	0	10	18	10	10	10	17	10	10
Group 6: Harlequin duck	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	60	0	0	0	0	50	0	50	19
		4	40	50	19	60	56	50	50	50	57
		5	0	50	81	40	44	0	50	0	24

Table 4.9 (continued)

Habitat & Species Groups	Area[1]	Outcome[2]	Period / Alternative[3]								
			H	C	A1	A2	A3	A4	A5	A6	A7
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	70	0	0	0	0	45	0	45	14
		4	30	43	15	55	51	55	45	55	57
		5	0	57	85	45	49	0	55	0	29
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	20	0	0	0	0	0	0	0	0
		3	40	0	0	0	0	60	0	60	19
		4	40	50	21	60	56	32	50	32	57
		5	0	50	79	40	44	8	50	8	24
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	20	0	0	0	0	0	0	0	0
		3	40	0	0	0	0	52	0	51	15
		4	40	41	17	57	49	34	47	34	59
		5	0	59	83	43	51	14	53	15	26
Group 7: Herons, egrets	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	100	64	61	66	64	76	71	76	61
		4	0	30	35	30	32	20	29	20	34
		5	0	6	4	4	4	4	0	4	5
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	4	2	4	2	6	2	6	5
		3	100	69	60	65	64	71	70	71	59
		4	0	19	34	26	30	19	26	19	31
		5	0	8	4	5	4	4	2	4	5
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	68	55	71	69	74	68	74	68
		4	20	28	39	27	29	23	28	23	30
		5	0	4	6	2	2	3	4	3	2
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	82	67	53	68	66	68	65	69	64
		4	18	29	41	30	32	28	31	27	34
		5	0	4	6	2	2	4	4	4	2
Group 8: Dabbling ducks	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	30	12	9	12	11	11	10	11	11
		3	70	58	46	67	67	73	52	73	65
		4	0	28	41	19	20	16	38	16	24
		5	0	2	4	2	2	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	44	16	12	15	13	15	13	15	13
		3	56	57	42	62	64	67	55	67	66
		4	0	25	42	22	22	18	32	18	21
		5	0	2	4	1	1	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	18	4	3	5	4	12	4	12	5
		3	80	60	47	66	69	66	56	66	61
		4	2	35	45	28	26	22	40	22	34
		5	0	1	5	1	1	0	0	0	0

Table 4.9 (continued)

Habitat & Species Groups	Area[1]	Outcome[2]	Period / Alternative[3]								
			H	C	A1	A2	A3	A4	A5	A6	A7
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	25	8	7	9	9	9	8	9	8
		3	75	58	43	57	57	63	52	63	56
		4	0	31	44	34	34	28	38	28	36
		5	0	3	6	0	0	0	2	0	0
Group 9: Spotted sandpiper	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	46	54	43	50	50	51	50	51	52
		3	54	46	51	50	50	49	50	49	48
		4	0	0	6	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	50	55	51	54	54	55	54	55	56
		3	50	45	43	46	46	45	46	45	44
		4	0	0	6	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	48	54	43	50	50	51	50	51	52
		3	52	46	51	50	50	49	50	49	48
		4	0	0	6	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	52	54	51	58	58	59	58	59	60
		3	48	46	43	42	42	41	42	41	40
		4	0	0	6	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
Group 10: Greater sandhill crane	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	5	0	0	0	0	3	0	3	0
		3	80	50	34	53	53	69	51	69	50
		4	15	50	65	48	48	29	49	29	50
		5	0	0	1	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	8	3	4	3	3	5	3	5	3
		3	79	56	39	56	56	70	55	70	54
		4	14	41	56	41	41	25	43	25	44
		5	0	0	1	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	11	10	3	5	5	10	5	10	5
		3	73	61	46	56	56	68	55	68	53
		4	16	29	51	39	39	23	40	23	43
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	13	5	3	4	4	8	4	8	4
		3	71	63	45	55	55	70	54	70	51
		4	16	33	53	41	41	23	43	23	45
		5	0	0	0	0	0	0	0	0	0
Group 11: Rails, avocets	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	1	0	1	0
		3	69	54	36	57	57	69	54	68	52
		4	31	46	54	41	41	30	44	31	46
		5	0	0	10	2	2	0	2	0	2

Table 4.9 (continued)

Habitat & Species Groups	Area[1]	Outcome[2]	Period / Alternative[3]								
			H	C	A1	A2	A3	A4	A5	A6	A7
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	8	2	2	2	2	3	2	3	2
		3	64	55	36	57	58	70	52	69	52
		4	28	43	53	39	38	27	44	28	44
		5	0	0	9	2	2	0	2	0	2
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	59	45	31	47	47	63	45	62	43
		4	41	55	60	52	52	37	54	38	56
		5	0	0	9	1	1	0	1	0	1
	UCRBCumEff	1	0	0	0	0	0	0	0	0	0
		2	4	2	2	2	2	3	2	3	2
		3	64	50	34	52	52	69	48	68	50
		4	32	48	56	45	45	28	49	29	47
		5	0	0	8	1	1	0	1	0	1
Group 12: Curlew, willet	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	28	10	3	13	13	21	9	21	9
		4	73	90	95	88	88	79	91	79	89
		5	0	0	3	0	0	0	0	0	3
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	33	14	5	16	16	24	13	24	13
		4	68	86	93	84	84	76	88	76	85
		5	0	0	3	0	0	0	0	0	3
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	28	10	3	13	13	18	9	18	9
		4	73	90	95	88	88	83	91	83	89
		5	0	0	3	0	0	0	0	0	3
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	33	14	5	16	16	24	13	24	13
		4	68	86	93	84	84	76	88	76	85
		5	0	0	3	0	0	0	0	0	3
Group 13: Upland sandpiper	EEIS BLM/FS[4]	1	2	0	0	0	0	0	0	0	0
		2	68	0	0	0	0	0	0	0	0
		3	30	0	0	0	0	0	0	0	0
		4	0	0	0	2	10	25	10	25	15
		5	0	100	100	98	90	75	90	75	85
	EEIS CumEff	1	2	0	0	0	0	0	0	0	0
		2	66	0	0	0	0	0	0	0	0
		3	32	0	0	0	0	0	0	0	0
		4	0	0	0	2	2	12	0	12	2
		5	0	100	100	98	98	88	100	88	98
	UCRB BLM/FS[4]	1	0	0	0	0	0	0	0	0	0
		2	66	0	0	0	0	0	0	0	0
		3	34	0	0	0	0	0	0	0	0
		4	0	0	0	2	10	25	10	25	15
		5	0	100	100	98	90	75	90	75	85

Table 4.9 (continued)

Habitat & Species Groups	Area[1]	Outcome[2]	H	C	A1	A2	A3	A4	A5	A6	A7
			Period / Alternative[3]								
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	66	0	0	0	0	0	0	0	0
		3	34	0	0	0	0	0	0	0	0
		4	0	0	0	2	2	12	0	12	2
		5	0	100	100	98	98	88	100	88	98
Group 14: Common snipe	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	20	12	9	16	16	20	10	20	15
		3	74	68	55	65	65	67	64	66	63
		4	6	20	34	17	17	13	24	14	22
		5	0	0	2	2	2	0	2	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	18	12	10	15	15	18	11	18	14
		3	76	66	53	64	64	68	61	67	62
		4	6	22	35	19	19	14	26	15	24
		5	0	0	2	2	2	0	2	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	20	12	9	16	16	20	10	20	15
		3	74	68	55	64	64	67	63	66	63
		4	6	20	34	20	20	13	27	14	22
		5	0	0	2	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	18	12	10	15	15	18	11	18	14
		3	76	66	53	64	64	68	61	67	62
		4	6	22	35	19	19	14	26	15	24
		5	0	0	2	2	2	0	2	0	0
Group 15: Migrant sandpipers	EEIS BLM/FS	1	32	20	15	24	24	25	16	25	24
		2	52	51	48	48	48	48	49	48	48
		3	16	29	35	28	28	27	35	27	28
		4	0	0	2	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	36	25	17	25	25	26	21	26	25
		2	50	53	53	53	53	53	52	53	53
		3	14	22	28	22	22	21	27	21	22
		4	0	0	2	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	UCRB BLM/FS	1	28	12	5	12	12	22	6	22	12
		2	57	59	57	59	59	54	58	54	59
		3	15	29	36	29	29	24	36	24	29
		4	0	0	2	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff	1	35	24	13	25	25	25	14	25	22
		2	51	55	56	55	55	56	56	56	57
		3	14	21	29	20	20	19	30	19	21
		4	0	0	2	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0

[1]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[2]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[4]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

Table 4.10. Mean viability outcomes for habitat and species groups of waterbirds and shorebirds for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

		Period / Alternative[2]								
Habitat & Species Group	Area[1]	H	C	A1	A2	A3	A4	A5	A6	A7
Group 1: Open waterbirds	EEIS BLM/FS	3.0	3.6	3.8	3.5	3.5	3.3	3.5	3.3	3.5
	EEIS CumEff	3.1	3.5	3.7	3.5	3.5	3.3	3.5	3.3	3.5
	UCRB BLM/FS	3.2	3.5	3.8	3.4	3.4	3.3	3.6	3.3	3.3
	UCRB CumEff	3.1	3.4	3.7	3.4	3.4	3.2	3.5	3.2	3.3
Group 2: Common loon	EEIS BLM/FS	3.7	3.6	3.8	3.6	3.6	3.5	3.6	3.5	3.6
	EEIS CumEff	3.5	3.3	3.6	3.3	3.3	3.3	3.3	3.3	3.3
	UCRB BLM/FS	3.8	3.6	3.8	3.5	3.5	3.5	3.5	3.5	3.5
	UCRB CumEff	3.6	3.3	3.6	3.4	3.4	3.3	3.3	3.3	3.4
Group 3: Wood duck, mergansers	EEIS BLM/FS	3.6	3.5	3.7	3.4	3.5	3.1	3.5	3.1	3.4
	EEIS CumEff	3.6	3.6	3.8	3.5	3.5	3.2	3.6	3.2	3.4
	UCRB BLM/FS	2.9	3.0	3.3	3.1	3.2	2.8	3.1	2.8	2.9
	UCRB CumEff	3.0	3.1	3.4	3.3	3.3	2.9	3.2	2.9	3.1
Group 4: Goldeneyes	EEIS BLM/FS	3.6	3.8	4.2	3.8	3.9	3.6	3.8	3.6	3.8
	EEIS CumEff	3.6	3.8	4.1	3.8	4.0	3.6	3.9	3.6	3.8
	UCRB BLM/FS	3.5	3.7	4.1	3.7	3.8	3.5	3.7	3.5	3.6
	UCRB CumEff	3.5	3.8	4.1	3.7	3.9	3.6	3.8	3.6	3.7
Group 5: Western snowy plover	EEIS BLM/FS	4.0	4.0	4.1	4.0	4.0	4.0	4.1	4.0	4.0
	EEIS CumEff	4.0	4.1	4.2	4.1	4.1	4.1	4.2	4.1	4.1
Group 6: Harlequin duck	EEIS BLM/FS	3.4	4.5	4.8	4.4	4.4	3.5[3]	4.5	3.5[3]	4.1
	EEIS CumEff	3.3	4.6	4.9	4.5	4.5	3.6[3]	4.6	3.6[3]	4.2
	UCRB BLM/FS	3.2	4.5	4.8	4.4	4.4	3.5[3]	4.5	3.5[3]	4.1
	UCRB CumEff	3.2	4.6	4.8	4.4	4.5	3.6[3]	4.5	3.6[3]	4.1
Group 7: Herons, egrets	EEIS BLM/FS	3.0	3.4	3.4	3.4	3.4	3.3	3.3	3.3	3.4
	EEIS CumEff	3.0	3.3	3.4	3.3	3.4	3.2	3.3	3.2	3.4
	UCRB BLM/FS	3.2	3.4	3.5	3.3	3.3	3.3	3.4	3.3	3.3
	UCRB CumEff	3.2	3.4	3.5	3.3	3.4	3.4	3.4	3.4	3.4
Group 8: Dabbling ducks	EEIS BLM/FS	2.7	3.2	3.4	3.1	3.1	3.1	3.3	3.1	3.1
	EEIS CumEff	2.6	3.1	3.4	3.1	3.1	3.0	3.2	3.0	3.1
	UCRB BLM/FS	2.8	3.3	3.5	3.3	3.2	3.1	3.4	3.1	3.3
	UCRB CumEff	2.8	3.3	3.5	3.3	3.3	3.2	3.3	3.2	3.3
Group 9: Spotted sandpiper	EEIS BLM/FS	2.5	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.5
	EEIS CumEff	2.5	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.4
	UCRB BLM/FS	2.5	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.5
	UCRB CumEff	2.5	2.5	2.6	2.4	2.4	2.4	2.4	2.4	2.4
Group 10: Greater sandhill crane	EEIS BLM/FS	3.1	3.5	3.7	3.5	3.5	3.3	3.5	3.3	3.5
	EEIS CumEff	3.1	3.4	3.6	3.4	3.4	3.2	3.4	3.2	3.4
	UCRB BLM/FS	3.1	3.2	3.5	3.3	3.3	3.1	3.4	3.1	3.4
	UCRB CumEff	3.0	3.3	3.5	3.4	3.4	3.2	3.4	3.2	3.4
Group 11: Rails, avocets	EEIS BLM/FS	3.3	3.5	3.7	3.5	3.5	3.3	3.5	3.3	3.5
	EEIS CumEff	3.2	3.4	3.7	3.4	3.4	3.2	3.5	3.3	3.5
	UCRB BLM/FS	3.4	3.6	3.8	3.5	3.5	3.4	3.6	3.4	3.6
	UCRB CumEff	3.3	3.5	3.7	3.5	3.5	3.3	3.5	3.3	3.5

Table 4.10 (continued)

Habitat & Species Group	Area[1]	Period / Alternative[2] H	C	A1	A2	A3	A4	A5	A6	A7
Group 12: Curlew, willet	EEIS BLM/FS	3.7	3.9	4.0	3.9	3.9	3.8	3.9	3.8	3.9
	EEIS CumEff	3.7	3.9	4.0	3.8	3.8	3.8	3.9	3.8	3.9
	UCRB BLM/FS	3.7	3.9	4.0	3.9	3.9	3.8	3.9	3.8	3.9
	UCRB CumEff	3.7	3.9	4.0	3.8	3.8	3.8	3.9	3.8	3.9
Group 13: Upland sandpiper	EEIS BLM/FS[4]	2.3	5.0	5.0	5.0	4.9	4.8	4.9	4.8	4.9
	EEIS CumEff	2.3	5.0	5.0	5.0	5.0	4.9	5.0	4.9	5.0
	UCRB BLM/FS[4]	2.3	5.0	5.0	5.0	4.9	4.8	4.9	4.8	4.9
	UCRB CumEff	2.3	5.0	5.0	5.0	5.0	4.9	5.0	4.9	5.0
Group 14: Common snipe	EEIS BLM/FS	2.9	3.1	3.3	3.1	3.1	2.9	3.2	2.9	3.1
	EEIS CumEff	2.9	3.1	3.3	3.1	3.1	3.0	3.2	3.0	3.1
	UCRB BLM/FS	2.9	3.1	3.3	3.0	3.0	2.9	3.2	2.9	3.1
	UCRB CumEff	2.9	3.1	3.3	3.1	3.1	3.0	3.2	3.0	3.1
Group 15: Migrant sandpipers	EEIS BLM/FS	1.8	2.1	2.2	2.0	2.0	2.0	2.2	2.0	2.0
	EEIS CumEff	1.8	2.0	2.2	2.0	2.0	2.0	2.1	2.0	2.0
	UCRB BLM/FS	1.9	2.2	2.4	2.2	2.2	2.0	2.3	2.0	2.2
	UCRB CumEff	1.8	2.0	2.2	2.0	2.0	1.9	2.2	1.9	2.0

[1]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[2]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[3]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table may be misleading.

[4]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

Upland gamebirds, hawks, falcons, pigeons, and owls

Introduction—Four gamebirds, four hawks, nine owls, band-tailed pigeons, bald eagles, and merlins were selected for detailed analysis. One of these, the bald eagle, is federally threatened and five species (Columbian sharp-tailed grouse, sage grouse, burrowing owl, ferruginous hawk, and northern goshawk) are Federal C2 Candidate species. All of the selected species are associated with habitats that have declined from historic conditions or are expected to decline under one or more alternatives. Eight of the species are primarily forest associates, five are shrubland and grassland associates, three are riparian associates, and four are woodland associates.

Methods—Methods used to assess this group of species followed those outlined in the section "Methods for Assessing Effects on Terrestrial Species."

Results—Scores from the panel assessment were used as the final results with no adjustments. Mean scores for each of the outcomes for each species are shown in table 4.11. Weighted means are in table 4.12. The number of species whose weighted mean fell into each outcome class under each alternative is shown in figure 4.19. The weighted means for each alternative are shown in figure 4.20 and the numbers of species whose weighted mean outcome changed by more than 0.5 of an outcome class between current and the projected future under each alternative are shown in figure 4.21.

Figure 4.19 indicates that historic patterns of habitat were capable of supporting most of these species in conditions described by Outcomes 2 or

3 as broadly distributed to patchy habitat, with populations continuously interacting or acting as metapopulations. Habitat for a few species, Columbian sharp-tailed grouse, burrowing owl, northern pygmy-owl, and northern saw-whet owl, displayed characteristics of Outcome 1. Habitat for two species, boreal owl (EEIS planning area) and band-tailed pigeon (UCRB planning area), was projected to have supported only disjunct, isolated populations. Habitats have declined from historic to current and no species currently have a weighted average Outcome of 1. Two species, Columbian sharp-tailed grouse in both EIS areas and mountain quail in the UCRB, have weighted average Outcomes of 5. Weighted average outcomes are most positive under Alternatives 4 and 6, intermediate under Alternatives 3, 5, and 7, and least favorable under Alternatives 1 and 2 (figs. 4.19 and 4.20). While this group of species has very diverse habitat associations, Alternatives 4 and 6 were judged as having positive effects for many of them because of the emphasis of those alternatives on ecosystem restoration. Restoration was interpreted by the panel to apply to all ecosystems including forested communities, native shrublands, native grasslands, and a variety of riparian communities.

Results for each of the individual species are discussed in more detail below.

Discussion—

Blue grouse. Blue grouse use a mix of forested stages in the ponderosa pine and montane forest vegetation communities (Johnsgard 1983). They tend to use more open forests, including riparian woodland, during the breeding season. Early- and late-seral forest stages are most important as winter habitat. Current management practices, including practices that have altered fire regimes,

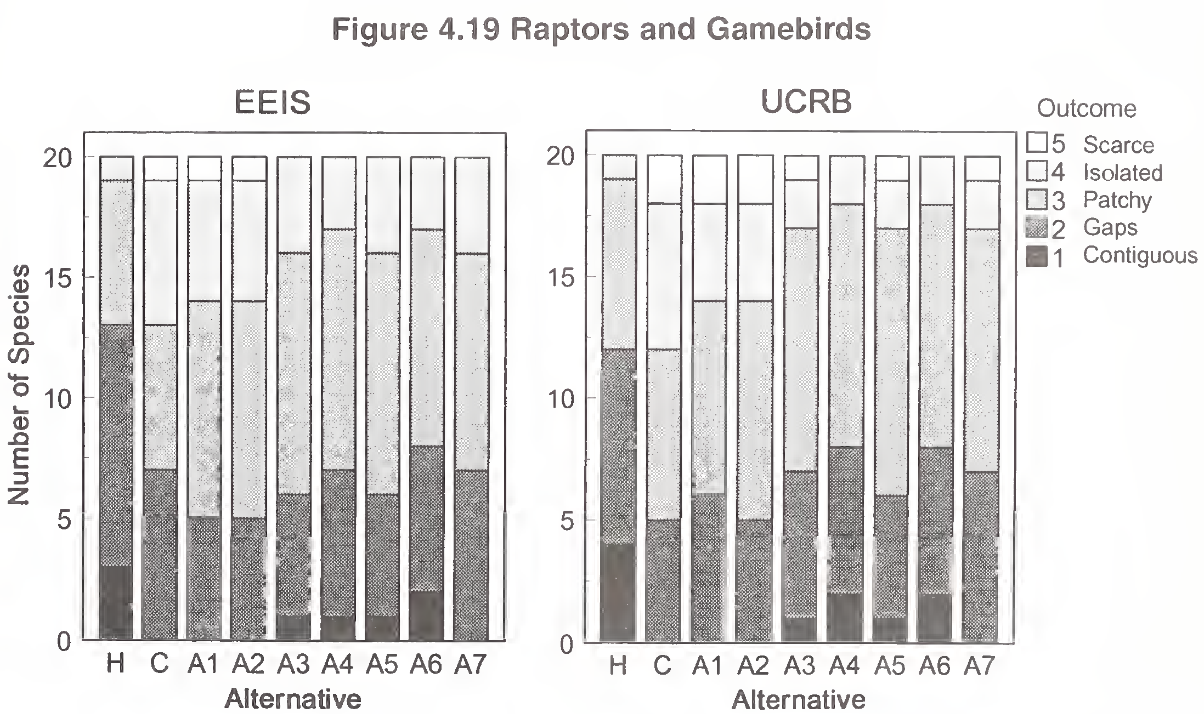

Figure 4.19. Frequency distribution of mean habitat outcome scores for 20 species of raptors and gamebirds on Federal lands in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

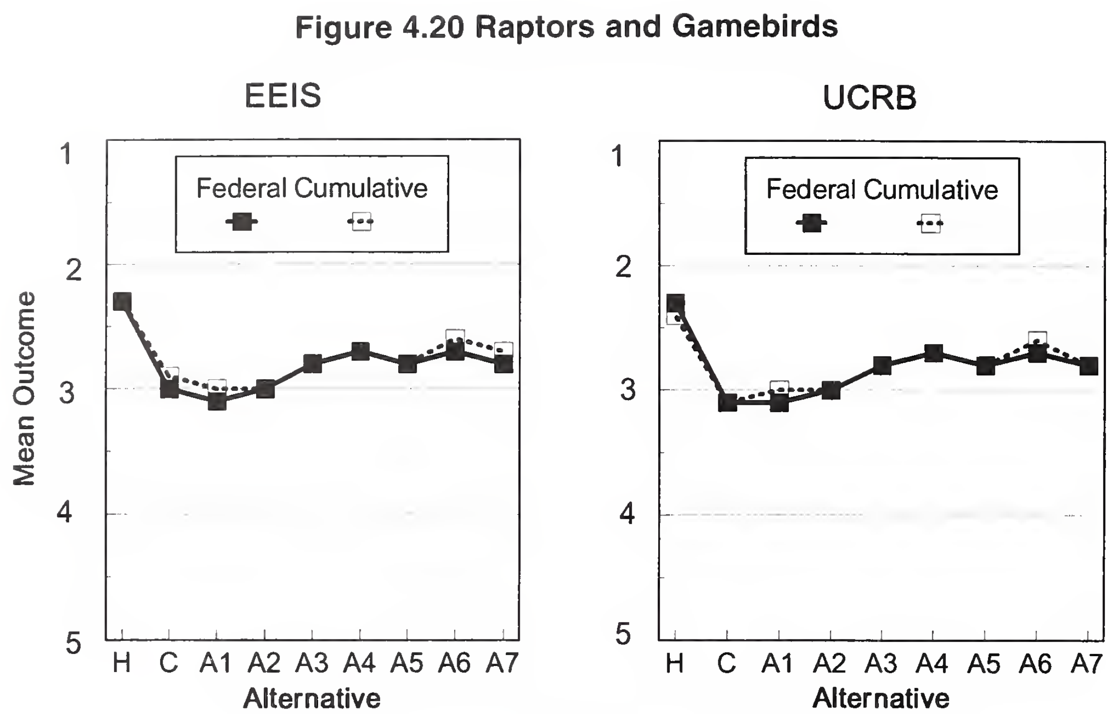

Figure 4.20. Mean outcome scores averaged over 20 species of raptors and gamebirds in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

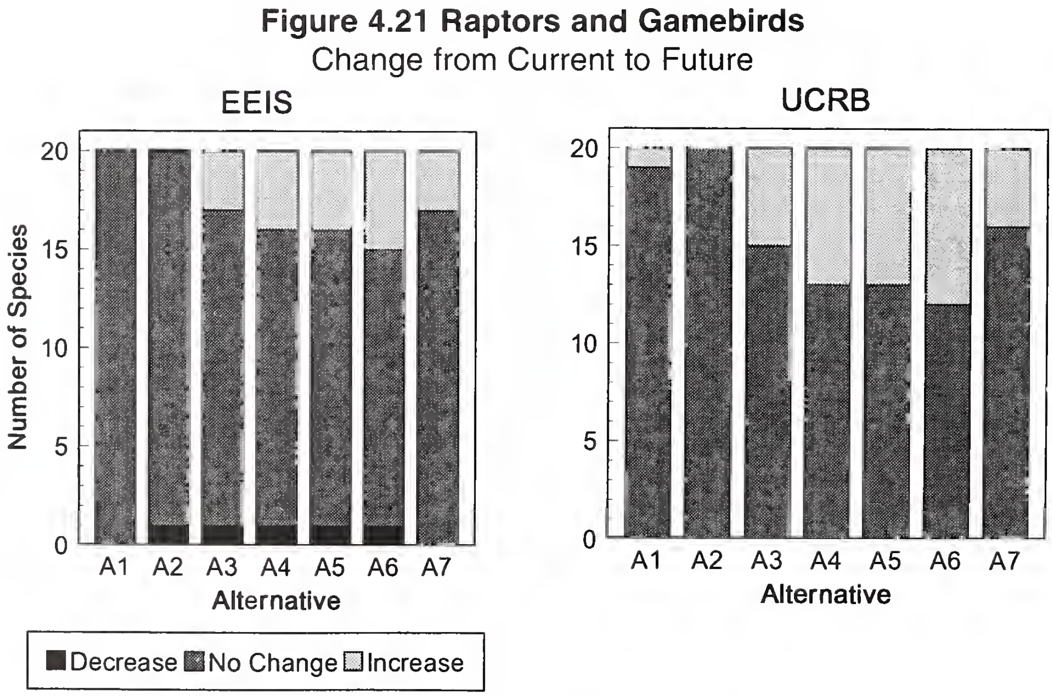

Figure 4.21. Departure of habitat outcomes on Federal lands from current conditions under each alternative for 20 species of raptors and gamebirds in the EEIS and UCRB planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

have reduced the amount and interspersion of early- and late-seral stages, resulting in a decline in habitat for blue grouse from historical to current periods. Significant improvement in Federal habitat is projected under Alternatives 3 through 7 (table 4.11) because of projected increases in the amount of early- and late-seral stages, and because of a trend toward historic patterns of interspersion of seral stages. However, under any alternative, the habitat available to blue grouse is expected to provide for continued existence of broad to patchy habitat distribution with largely interconnected populations.

Columbian sharp-tailed grouse. Columbian sharp-tailed grouse is a Federal C2 Candidate species. Populations of sharp-tailed grouse have declined sharply in the past due to both hunting and reduction in habitat. They currently occupy only a fraction of their historical range (Johnsgard 1983). They were historically more broadly distributed within the UCRB EIS area than in the EEIS area, but currently exist as only remnant populations in both areas. Upland shrubland and upland herbland are primary habitats (Marks and Marks 1987, Saab and Marks 1992), and both have declined significantly due to conversion to agriculture, grazing, and invasion of non-native plants. Restoration efforts are needed to improve habitat conditions for the species. No improvement is expected under Alternatives 1 and 2 (table 4.11), while Alternatives 3 through 6 are projected to result in the most substantial improvements. Outcomes are expected to be somewhat better under Alternatives 4 and 6 than under Alternatives 3 and 5 because of the more active approach to restoration taken in the former two alternatives. The difference is not a large one however, because of the uncertainty surrounding our ability to actively restore the native shrubland and herbland communities. Under any alternative, however, habitat conditions for sharp-tailed grouse are projected to remain significantly below historic conditions, with habitat capable of supporting only scattered populations and continued probability of local extirpations. The likelihood of extirpations is projected to remain high (> 50%) under Alternatives 1 and 2.

Mountain quail. Primary habitats for mountain quail are riparian zones with tree or shrub cover (Ormiston 1966). Within the Basin, mountain quail historically occupied habitats in western Idaho and along the east slope of the Oregon Cascades Mountains. Habitat has declined on both Federal and non-Federal lands in both EIS areas, most significantly in the UCRB where the species now only occurs in a few scattered pockets (Vogel and Reese 1995). The major factor causing habitat decline has been the reduction in riparian shrub cover and change in riparian shrub species due to grazing. Modification of grazing practices and active restoration of riparian shrub communities would provide the most benefits to mountain quail habitat. Thus, Alternatives 4 and 6 are projected to produce the best habitat outcomes over a 100-year period. Under all alternatives, both habitat and populations in the UCRB are projected to remain patchy and isolated to varying degrees. The likelihood of extirpations is projected to be highest under Alternatives 1 and 2.

Sage grouse. Sage grouse is a Federal C2 Candidate species. Primary habitat is upland shrubland dominated by big sagebrush and perennial bunchgrasses (Call and Maser 1985, Eng and Schladweiler 1972, Wallestad 1971). Habitat has declined historically due to conversions to agriculture and invasions of non-native plants. Populations have declined both in response to loss of habitat and as a result of hunting (Crawford and Lutz 1985). Significant isolation of habitat and populations is projected to have occurred in both EIS areas (table 4.11). Habitat restoration is possible and is projected to result in the greatest changes in habitat under Alternatives 4 and 6. These alternatives, and to a lesser degree Alternatives 3, 5 and 7, would potentially reduce the likelihood of both habitat and population isolation in both EIS areas.

Band-tailed pigeon. Band-tailed pigeons are peripheral to the ICBEMP assessment area as most of their breeding range is on the west side of the Oregon and Washington Cascade Mountains. However, there is some breeding range on the eastern slope of the Cascades, and migrating pigeons

also move through northern Idaho and western Montana (Ryser 1985). Important habitat within the Basin includes late-seral montane forest, late-seral ponderosa pine forest, and woodland upland. Habitat and populations are estimated to have declined historically in the EEIS area, but little change is thought to have occurred historically in the UCRB EIS area (table 4.11). It is projected that Alternatives 3 through 6 would restore habitat for band-tailed pigeons by increasing late-seral ponderosa pine and montane forests, and by restoring historic patterns of interspersion of seral stages. Improvement is projected to be greatest in the EEIS area, with habitat likely to support interacting or continuous populations. Alternatives 1, 2 and 7 are projected to provide little benefit.

Bald eagle. Bald eagles are federally threatened. Habitat and populations were never continuously distributed within the EIS areas, but were always naturally fragmented. Large trees near riparian areas are important for nesting (Anthony and Issacs 1989). Winter communal roosts are described as forest stands with old, open-structured trees close to feeding areas (Keister and Anthony 1983). Both habitat and populations have declined historically, with populations affected by loss of habitat and other factors such as pesticides (Anthony and others 1993) and illegal killing (Bortolotti 1984). A recovery plan has been in effect and has resulted in upward trends in both habitat and population. These trends are expected to continue under any of the alternatives. While none of the alternatives is expected to restore habitat or populations to historic conditions, they all would reduce the likelihood of population isolation and extirpation (table 4.11).

Cooper's hawk. Cooper's hawks historically were broadly and evenly distributed across the Basin. They tend to be habitat generalists, using all seral stages of montane and lower montane community types in addition to upland and riparian woodland. Cooper's hawk habitat and populations are projected to have declined moderately from historic levels (table 4.11), but restoration of those habitats is possible under forest management practices that promote aspen and a mix of forest structures including small openings, clumps of trees of differing densities, and multi-age stands. Alternatives 3 through 7 are projected to result in the greatest improvements in habitat, restoring it to near historic levels on Federal land. Little likelihood of population isolation or local extirpations is projected under any of the alternatives.

Ferruginous hawk. Ferruginous hawk is a Federal C2 Candidate species. Important habitats for ferruginous hawks in the Basin are upland shrubland (sagebrush, saltbush and greasewood), upland herbland, woodland upland, and, to a lesser extent, exotic herbland (Bechard and Schumtz 1995). Habitat for ferruginous hawks is projected to have declined from historic levels due to the conversion of grasslands and shrublands to agriculture and to changes resulting from grazing. Roads and other human disturbances may be a factor in the use of habitat by ferruginous hawks as isolation from human disturbance is considered a significant factor affecting their nest placement (Gilmer and Stewart 1983). Alternatives 1 and 2 were projected to result in little change to the current situation for ferruginous hawk habitat with some likelihood remaining for isolation of local populations (table 4.11). Alternatives 3 through 7 are expected to result in some improvements due to restoration activities in shrublands. Alternatives 4 and 6 would potentially result in the greatest improvements due to restoration activities. Alternative 7 was projected to improve conditions by reducing road densities.

Northern goshawk. Northern goshawk is a Federal C2 Candidate species. It uses old stands of multi-layered conifers for nesting (Reynolds and others 1982, Reynolds and Wight 1978) and a mixture of habitats including young forests and small openings for foraging (Johnsgard 1990). Its habitat is projected to have declined moderately from historic conditions (table 4.11), but the actual status of populations in the EIS areas is not well known. Restoration activities proposed under Alternatives 4 and 6 are projected to have the greatest beneficial effect on goshawk habitat by recreating historic patterns of interspersion of habitat types that are created by frequent, small-scale disturbance.

Table 4.11. Mean likelihood scores of viability outcomes for raptors and gamebirds for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means are calculated from the individual likelihood scores of panelists.

				Period / Alternative[4]								
Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
GMB	Band-tailed pigeon	EEIS BLM/FS	1	34	4	2	2	14	16	12	16	4
			2	31	28	26	30	24	23	24	23	33
			3	32	40	42	39	38	43	38	38	39
			4	3	24	30	29	24	18	26	23	24
			5	0	4	0	0	0	0	0	0	0
		EEIS CumEff	1	36	2	1	1	13	15	11	15	3
			2	28	26	25	28	22	21	22	21	31
			3	33	42	41	42	35	39	38	38	40
			4	3	24	33	29	30	25	29	26	26
			5	0	6	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	4
			2	2	4	4	4	14	16	12	16	12
			3	22	22	36	36	30	29	30	29	30
			4	48	36	44	48	46	46	48	46	44
			5	28	38	16	12	10	9	10	9	10
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	2	2	2	2	16	16	16	16	16
			3	24	22	36	36	26	27	26	27	28
			4	47	36	44	48	46	46	46	46	44
			5	27	40	18	14	12	11	12	11	12
GMB	Blue grouse	EEIS BLM/FS	1	42	16	14	14	24	27	24	27	22
			2	44	50	44	44	57	56	57	56	60
			3	14	34	36	36	19	17	19	17	18
			4	0	0	6	6	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	44	16	16	16	25	27	25	27	23
			2	42	49	42	43	56	56	56	56	59
			3	14	35	36	35	19	17	19	17	18
			4	0	0	6	6	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	54	14	17	17	27	29	27	29	25
			2	44	50	41	43	55	54	55	54	57
			3	2	36	37	35	18	17	18	17	18
			4	0	0	5	5	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	56	14	17	17	27	29	27	27	25
			2	44	50	43	44	56	55	55	57	59
			3	0	36	40	39	17	16	18	16	16
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
GMB	Columbian sharp-tailed grouse	EEIS BLM/FS	1	74	0	0	0	0	0	0	0	0
			2	26	0	0	0	2	2	2	2	2
			3	0	2	2	2	14	16	14	16	6
			4	0	20	32	30	47	58	51	57	45
			5	0	78	66	68	37	24	33	25	47

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		EEIS CumEff	1	76	0	0	0	0	0	0	0	0
			2	24	0	0	0	4	4	4	4	4
			3	0	2	2	2	14	22	14	22	10
			4	0	32	39	37	46	52	50	51	41
			5	0	66	59	61	36	22	32	23	45
		UCRB BLM/FS	1	62	0	0	0	0	0	0	0	0
			2	38	0	0	0	2	2	2	2	2
			3	0	2	2	2	14	16	14	16	6
			4	0	32	37	37	53	59	56	56	45
			5	0	66	61	61	31	23	28	26	47
		UCRB CumEff	1	66	0	0	0	0	0	0	0	0
			2	34	0	0	0	2	2	2	2	2
			3	0	2	2	2	16	24	16	24	12
			4	0	36	42	42	50	53	53	50	41
			5	0	62	56	56	32	21	29	24	45
GMB	Mountain quail	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	62	2	0	0	0	8	0	8	6
			3	22	27	28	29	32	42	37	44	42
			4	16	54	47	48	50	43	49	41	38
			5	0	17	25	23	18	7	14	7	14
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	68	2	0	0	0	0	0	0	0
			3	26	36	33	35	46	55	45	58	47
			4	6	57	59	58	52	45	52	42	51
			5	0	5	8	7	2	0	3	0	2
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	18	0	0	0	0	0	0	0	0
			3	38	0	2	2	8	12	6	13	8
			4	32	18	22	25	27	36	30	39	29
			5	12	82	76	73	65	52	64	48	63
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	24	0	0	0	0	0	0	0	0
			3	37	2	3	3	8	12	7	12	8
			4	35	22	24	29	32	43	32	47	33
			5	4	76	73	68	60	45	61	41	59
GMB	Sage grouse	EEIS BLM/FS	1	42	0	0	0	8	16	7	20	5
			2	54	16	8	12	31	47	38	46	43
			3	4	52	47	52	41	33	41	30	42
			4	0	28	41	32	18	4	12	4	10
			5	0	4	4	4	2	0	2	0	0
		EEIS CumEff	1	48	0	0	0	2	14	1	18	5
			2	49	22	10	12	35	49	42	48	43
			3	3	49	48	55	44	34	44	31	43
			4	0	25	38	29	17	3	11	3	9
			5	0	4	4	4	2	0	2	0	0
		UCRB BLM/FS	1	44	0	0	0	14	20	13	22	5
			2	52	18	10	18	22	42	30	43	41
			3	4	56	49	50	44	34	41	31	42
			4	0	24	39	30	20	4	16	4	12
			5	0	2	2	2	0	0	0	0	0

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		UCRB CumEff	1	50	0	0	0	1	14	1	16	3
			2	47	22	10	18	33	48	40	49	42
			3	3	53	50	51	47	35	44	32	44
			4	0	23	38	29	19	3	15	3	11
			5	0	2	2	2	0	0	0	0	0
RAP	Bald eagle	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	32	6	10	15	15	19	15	19	16
			3	60	42	52	62	68	70	70	70	70
			4	8	42	30	23	17	11	15	11	14
			5	0	10	8	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	44	0	8	16	16	23	16	24	21
			3	50	45	49	58	64	66	66	65	66
			4	6	43	33	26	20	11	18	11	13
			5	0	12	10	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	32	6	10	15	15	19	15	19	16
			3	60	42	52	62	68	70	70	70	70
			4	8	42	30	23	17	11	15	11	14
			5	0	10	8	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	44	0	8	16	16	23	16	24	21
			3	50	45	49	58	64	66	66	65	66
			4	6	43	33	26	20	11	18	11	13
			5	0	12	10	0	0	0	0	0	0
RAP	Barred owl	EEIS BLM/FS	1	0	12	6	0	0	0	0	0	8
			2	12	60	49	37	23	21	23	21	56
			3	56	28	33	34	45	42	44	44	32
			4	18	0	12	29	32	35	33	35	4
			5	14	0	0	0	0	2	0	0	0
		EEIS CumEff	1	0	6	8	0	6	6	6	6	0
			2	0	52	42	32	24	24	24	24	52
			3	6	42	38	41	45	41	45	43	36
			4	10	0	12	27	25	29	25	27	12
			5	84	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	2	2	8	6	6	6	7	6	10
			2	18	32	51	50	51	50	56	48	62
			3	58	38	35	32	32	34	35	36	26
			4	22	28	6	12	11	10	2	10	2
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	2	12	6	10	10	10	10	8
			2	0	24	51	51	47	47	45	47	60
			3	0	34	31	31	31	33	33	34	22
			4	14	32	6	12	12	10	12	9	10
			5	86	8	0	0	0	0	0	0	0
RAP	Boreal owl	EEIS BLM/FS	1	2	0	0	0	0	0	0	0	2
			2	2	0	2	2	2	2	2	2	2
			3	24	18	16	16	27	28	26	28	38
			4	32	40	37	39	36	35	35	35	36
			5	40	42	45	43	35	35	37	35	22

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		EEIS CumEff	1	0	0	0	0	0	0	0	0	2
			2	2	2	2	2	2	2	2	2	2
			3	16	16	17	17	20	20	20	20	29
			4	46	38	35	37	39	38	37	38	40
			5	36	44	46	44	39	40	41	40	27
		UCRB BLM/FS	1	2	0	2	2	2	2	2	2	3
			2	36	7	10	10	23	24	22	23	26
			3	36	42	34	36	37	36	36	39	40
			4	24	24	39	38	32	32	34	32	30
			5	2	27	15	14	6	6	6	4	1
		UCRB CumEff	1	0	0	2	2	2	2	2	2	3
			2	22	7	10	10	10	10	10	10	12
			3	38	40	36	36	44	45	44	47	49
			4	30	26	39	40	40	39	39	39	36
			5	10	27	13	12	4	4	5	2	0
RAP	Burrowing owl	EEIS BLM/FS	1	56	0	0	0	0	0	0	0	0
			2	38	33	31	31	31	37	35	39	34
			3	6	42	44	44	47	44	44	42	45
			4	0	21	21	21	22	19	21	19	21
			5	0	4	4	4	0	0	0	0	0
		EEIS CumEff	1	70	0	0	0	0	0	0	0	0
			2	26	38	33	33	32	37	36	39	35
			3	4	43	48	47	47	46	45	45	43
			4	0	19	17	18	21	17	19	16	22
			5	0	0	2	2	0	0	0	0	0
		UCRB BLM/FS	1	52	0	0	0	0	0	0	0	0
			2	42	36	32	32	34	39	36	41	35
			3	6	40	42	40	47	44	44	42	45
			4	0	20	20	22	19	17	20	17	20
			5	0	4	6	6	0	0	0	0	0
		UCRB CumEff	1	65	0	0	0	0	0	0	0	0
			2	31	40	34	34	34	38	36	40	35
			3	4	41	49	48	49	47	47	46	45
			4	0	19	15	16	17	15	17	14	20
			5	0	0	2	2	0	0	0	0	0
RAP	Cooper's hawk	EEIS BLM/FS	1	34	14	12	12	28	30	28	30	30
			2	50	36	34	38	40	50	40	50	40
			3	14	48	50	46	30	20	30	20	28
			4	2	2	4	4	2	0	2	0	2
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	38	19	18	18	34	36	34	36	35
			2	52	41	39	43	46	54	46	54	45
			3	10	40	41	37	20	10	20	10	20
			4	0	0	2	2	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	34	15	15	15	30	31	30	31	31
			2	50	36	34	38	40	50	40	50	40
			3	14	47	47	43	28	19	28	19	27
			4	2	2	4	4	2	0	2	0	2
			5	0	0	0	0	0	0	0	0	0

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		UCRB CumEff	1	38	16	16	16	31	32	31	32	32
			2	52	43	40	44	48	58	48	58	48
			3	10	41	42	38	21	10	21	10	20
			4	0	0	2	2	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
RAP	Ferruginous hawk	EEIS BLM/FS	1	2	0	0	0	0	0	0	0	0
			2	66	24	23	28	38	52	39	56	44
			3	32	56	57	54	57	46	56	42	52
			4	0	18	18	14	5	2	5	2	4
			5	0	2	2	4	0	0	0	0	0
		EEIS CumEff	1	6	0	0	0	0	0	0	0	0
			2	70	29	32	33	41	55	40	57	49
			3	24	66	66	65	59	45	60	43	51
			4	0	5	2	2	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	2	0	0	0	0	0	0	0	0
			2	64	22	21	26	36	50	37	54	42
			3	34	58	59	56	59	48	58	44	54
			4	0	18	18	14	5	2	5	2	4
			5	0	2	2	4	0	0	0	0	0
		UCRB CumEff	1	6	0	0	0	0	0	0	0	0
			2	70	29	32	33	41	55	40	57	49
			3	24	66	66	65	59	45	60	43	51
			4	0	5	2	2	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
RAP	Flammulated owl	EEIS BLM/FS	1	1	0	0	0	0	0	0	0	0
			2	76	2	1	6	19	26	18	22	14
			3	21	40	20	32	56	60	56	62	51
			4	2	38	39	46	21	13	22	14	27
			5	0	20	40	16	4	1	4	2	8
		EEIS CumEff	1	1	0	0	0	0	0	0	0	0
			2	76	2	1	5	18	25	17	21	13
			3	21	39	19	32	57	61	56	61	51
			4	2	39	38	47	21	13	23	16	28
			5	0	20	42	16	4	1	4	2	8
		UCRB BLM/FS	1	1	0	0	0	0	0	0	0	0
			2	76	2	1	6	19	26	18	22	14
			3	21	40	20	32	56	60	56	62	51
			4	2	38	39	46	21	13	22	14	27
			5	0	20	40	16	4	1	4	2	8
		UCRB CumEff	1	1	0	0	0	0	0	0	0	0
			2	76	2	1	6	19	26	18	22	14
			3	21	40	20	32	56	60	56	62	51
			4	2	38	39	46	21	13	22	14	27
			5	0	20	40	16	4	1	4	2	8
RAP	Great gray owl	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	10	4	0	4	2	2	2	2	2
			3	48	44	38	41	46	49	46	49	50
			4	36	32	40	35	46	45	45	45	30
			5	6	20	22	20	6	4	7	4	18

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	13	7	4	4	8	8	8	8	8
			3	51	44	43	43	48	50	48	50	50
			4	30	29	31	33	38	38	37	38	24
			5	6	20	22	20	6	4	7	4	18
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	20	6	14	16	20	22	20	22	23
			3	62	46	44	45	56	56	55	56	43
			4	16	38	34	31	20	22	24	22	32
			5	2	10	8	8	4	0	1	0	2
		UCRB CumEff	1	2	0	0	0	0	0	0	0	0
			2	22	8	18	18	22	24	22	24	27
			3	58	44	39	41	52	52	51	52	38
			4	16	39	35	33	22	24	26	24	33
			5	2	9	8	8	4	0	1	0	2
RAP	Long-eared owl	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	21	10	8	8	14	19	15	19	11
			3	53	38	33	29	43	46	41	46	41
			4	21	43	46	49	39	30	39	30	40
			5	5	10	14	15	5	5	5	5	8
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	26	14	10	11	19	23	19	23	14
			3	51	46	41	38	48	53	48	53	49
			4	19	35	39	43	31	23	31	23	30
			5	4	5	10	9	3	3	3	3	8
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	21	8	6	5	11	15	11	14	6
			3	53	38	33	31	44	48	44	48	43
			4	21	45	48	49	40	33	40	33	44
			5	5	10	14	15	5	5	5	5	8
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	28	10	6	6	14	18	13	16	6
			3	50	48	43	39	46	50	48	51	48
			4	19	38	41	46	38	30	38	30	39
			5	4	5	10	9	3	3	3	3	8
RAP	Merlin	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	30	20	16	15	22	24	20	24	19
			3	50	49	46	44	51	54	53	54	54
			4	20	29	35	37	25	21	25	21	24
			5	0	2	3	4	2	1	2	1	3
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	35	25	19	19	25	27	23	28	22
			3	52	47	50	50	49	51	52	51	52
			4	13	28	29	29	25	22	24	21	24
			5	0	0	2	2	1	0	1	0	2
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	30	20	19	17	25	27	22	27	21
			3	51	53	48	46	53	53	55	53	57
			4	19	27	33	37	22	20	23	20	22
			5	0	0	0	0	0	0	0	0	0

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	33	27	22	20	28	30	25	29	24
			3	53	50	53	52	52	51	54	52	56
			4	14	23	25	28	20	19	21	19	20
			5	0	0	0	0	0	0	0	0	0
RAP	Northern goshawk	EEIS BLM/FS	1	16	8	5	5	10	16	9	16	11
			2	54	46	35	37	40	48	41	50	44
			3	30	35	44	45	42	29	42	28	37
			4	0	11	16	13	8	7	8	6	8
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	20	10	6	6	9	20	8	20	12
			2	55	51	39	39	45	50	46	51	47
			3	25	32	46	48	39	24	40	27	37
			4	0	7	9	7	7	6	6	2	4
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	16	9	6	6	7	16	6	16	11
			2	56	38	33	34	41	47	42	49	49
			3	28	36	54	55	48	34	48	33	40
			4	0	17	7	5	4	3	4	2	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	20	10	8	8	10	20	9	20	14
			2	52	44	35	36	44	42	44	44	43
			3	28	32	53	53	44	37	45	35	42
			4	0	14	4	3	2	1	2	1	1
			5	0	0	0	0	0	0	0	0	0
RAP	Northern pygmy-owl	EEIS BLM/FS	1	65	44	35	45	54	59	54	59	51
			2	35	53	60	53	44	40	44	40	46
			3	0	4	5	3	3	1	3	1	3
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	66	45	36	46	55	60	55	60	53
			2	34	53	60	53	44	40	44	40	46
			3	0	3	4	1	1	0	1	0	1
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	68	46	38	48	54	61	54	61	51
			2	33	50	58	50	44	38	44	38	46
			3	0	4	5	3	3	1	3	1	3
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	69	48	39	49	55	63	55	63	53
			2	31	50	58	50	44	38	44	38	46
			3	0	3	4	1	1	0	1	0	1
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
RAP	Northern saw-whet owl	EEIS BLM/FS	1	71	37	32	34	49	56	49	61	49
			2	27	56	58	58	41	38	41	34	44
			3	2	7	10	8	10	6	10	5	7
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	74	38	32	34	49	57	49	62	50
			2	24	56	60	60	43	39	43	36	45
			3	2	6	8	6	8	4	8	2	5
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	73	39	32	36	51	58	51	63	51
			2	27	54	60	56	41	38	41	34	42
			3	0	7	8	8	8	4	8	3	7
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	76	40	32	36	51	59	51	64	52
			2	24	54	62	58	43	39	43	36	43
			3	0	6	6	6	6	2	6	0	5
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
RAP	Swainson's hawk	EEIS BLM/FS	1	23	32	32	32	35	35	35	35	31
			2	59	51	53	53	51	52	51	53	55
			3	14	17	15	15	14	13	14	12	14
			4	4	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	23	27	27	27	30	30	30	30	26
			2	59	51	53	53	54	55	54	56	58
			3	14	20	18	18	14	14	14	14	14
			4	4	2	2	2	2	1	2	0	2
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	23	32	32	32	35	35	35	35	31
			2	53	51	53	53	51	52	51	53	55
			3	20	17	15	15	14	13	14	12	14
			4	4	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	23	27	27	27	30	30	30	30	26
			2	53	51	53	53	54	55	54	56	58
			3	20	20	18	18	14	14	14	14	14
			4	4	2	2	2	2	1	2	0	2
			5	0	0	0	0	0	0	0	0	0
RAP	Western screech owl	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	56	33	22	31	36	46	38	47	43
			3	44	58	67	61	58	53	56	53	57
			4	0	9	11	8	6	1	6	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	61	29	20	32	39	48	42	50	47
			3	39	59	67	61	56	52	54	50	53
			4	0	12	13	7	5	0	4	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	56	33	22	31	36	46	38	47	43
			3	44	58	67	61	58	53	56	53	57
			4	0	9	11	8	6	1	6	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	59	31	22	32	37	47	40	49	45
			3	41	57	65	61	58	53	56	51	55
			4	0	12	13	7	5	0	4	0	0
			5	0	0	0	0	0	0	0	0	0

[1]Group: GMB - gamebird; RAP - raptor.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[4]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

Under other alternatives, little change from current habitat conditions is anticipated. Habitat is projected to support a population with higher likelihood of remaining broadly-distributed under Alternatives 4 and 6, with greater patchiness projected under other alternatives.

Swainson's hawk. Swainson's hawks use a wide variety of open habitats including riparian shrubland, upland herbland, upland shrubland, non-native grasses, and agricultural lands. Their habitat and population are projected to have changed little from historic conditions because of their ability to adapt to human-induced changes. Little future change is expected under the alternatives. The most significant concern for Swainson's hawks is the use of pesticides on winter range in south and central America.

Merlin. Important habitats for merlin in the Basin include riparian herb, shrub, and woodland; upland herb, shrub, and woodland; and late-seral, single-story lower montane forest. The distribution of merlins tends to be naturally patchy. Habitat has declined slightly from its historic condition (table 4.11) due to the reduction in single-story lower montane forest and upland woodland. Moderate habitat declines are projected to continue under Alternatives 1 and 2 with little change occurring under the other alternatives. Small likelihoods of local population isolation are projected to continue under all alternatives.

Barred owl. Barred owls, recent invaders in the assessment area, now occupy suitable habitat throughout the Basin. Primary habitats within the Basin are late-seral montane and subalpine multi-layered forest, and riparian woodland. The invasion of barred owls into the area may be due in part to increases in multi-layered forest that have resulted from fire suppression. The habitats that support barred owls are currently believed to be at higher than historic levels (table 4.11). In the EEIS area, late-seral montane multi-layered forest

is projected to decline under all alternatives except Alternative 7, with the greatest declines under Alternatives 4 and 6. Such a decline could be seen as beneficial by potentially slowing the invasion by barred owls. By contrast, this habitat is projected to increase in the UCRB EIS area because of the large area of fire- and harvest-influenced forest that will progress to late-seral condition within 100 years.

Boreal owl. Key habitats for boreal owls within the Basin are late-seral single- and multi-story subalpine forests. Boreal owls are exclusively secondary cavity nesters. Hayward and others (1993) found that boreal owls prefer more complex forests, with higher basal area, more large trees, and less understory development than average sites. They are distributed in relatively large, disjunct patches in the UCRB EIS area and in isolated, small patches within the EEIS area. Their distribution is determined by habitat and elevation. In surveys in Idaho and Montana (Hayward and others, 1987), 75 percent of boreal owl locations were above 5,227 feet elevation. Different patterns of habitat and species outcomes were projected for the two EIS areas (table 4.11). The EEIS area has never supported broadly distributed populations of boreal owls, so the projected historic outcomes were of scattered and isolated habitat and populations. A slight increase in isolation was projected to have occurred from historic to current conditions and would continue under Alternatives 1 and 2. A modest improvement was projected under Alternatives 3 through 7. However, under any conditions, boreal owls and their habitat will remain scattered in isolated areas in the EEIS area. The UCRB EIS area historically supported more habitat and populations that were reasonably well-connected. Habitat has declined historically due to both harvest and natural disturbances. Currently, boreal owl habitat and populations are thought to be more isolated with higher chances of extirpation than they were historically. The status of boreal owls and their habitat is projected to improve under all alternatives, with the greatest improvements on Federal land under Alternatives 3 through 7. Some likelihood of extirpation would remain under these alternatives, but the likelihood would be less than under current conditions or Alternatives 1 and 2.

Burrowing owl. Burrowing owls are distributed throughout the grasslands and shrublands in the Basin, with sagebrush steppe and native grassland providing key habitats (Green and Anthony 1989). They are listed as a Federal C2 Candidate species. Historically, their habitats and populations were likely to have been fairly broad in distribution, but have declined due to conversion of habitat to agriculture and other influences such as pesticides (Haug and others 1993). Their current situation consists of habitat with gaps large enough to result in some likelihood of population isolation (table 4.11). No significant change in habitat was projected under the alternatives, although restoration efforts under Alternatives 4 and 6 would have some beneficial effect compared to other alternatives.

Flammulated owl. Flammulated owls occur throughout the Basin where habitat is available. They are obligate cavity nesters whose primary habitat consists of a mosaic of open forests, dense forests, and open grasslands (Hayward and Verner 1994). The open forest preferred by flammulated owls contains large ponderosa pine and Douglas-fir trees (Goggins 1985). Such open forests have declined due to logging and fire suppression. Both habitat and populations of flammulated owls are projected to have declined from a historic situation of largely connected habitat, to a current situation of scattered and isolated habitat with a significant likelihood of local extirpations (table 4.11). Declines are projected to continue under Alternative 1 with an increasing likelihood of extirpations. Improvement is projected under Alternatives 2 through 7 with the greatest improvement resulting from restoration practices proposed under Alternatives 4 and 6. Restoration practices would return vegetation to historic patterns of interspersion. Alternatives 3 and 5 are projected to have a smaller positive effect because of some emphasis on timber production in potential flammulated habitat. Alternatives 2 and 7 are also projected to have smaller positive effects because of their emphasis on preservation of old forest rather than active restoration.

Table 4.12. Mean viability outcomes for habitat and populations of raptors and gamebirds for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

			Period / Alternative[3]								
Group[1]	Species Name	Area[2]	H	C	A1	A2	A3	A4	A5	A6	A7
GMB	Band-tailed pigeon	EEIS BLM/FS	2.0	3.0	3.0	3.0	2.7	2.6	2.8	2.7	2.8
		EEIS CumEff	2.0	3.1	3.1	3.0	2.8	2.7	2.9	2.8	2.9
		UCRB BLM/FS	4.0	4.1	3.7	3.7	3.5[4]	3.5[4]	3.6[4]	3.5[4]	3.4[4]
		UCRB CumEff	4.0	4.1	3.8	3.7	3.5[4]	3.5[4]	3.5[4]	3.5[4]	3.5[4]
GMB	Blue grouse	EEIS BLM/FS	1.7	2.2	2.3	2.3	2.0	1.9	2.0	1.9	2.0
		EEIS CumEff	1.7	2.2	2.3	2.3	1.9	1.9	1.9	1.9	2.0
		UCRB BLM/FS	1.5	2.2	2.3	2.3	1.9	1.9	1.9	1.9	1.9
		UCRB CumEff	1.4	2.2	2.2	2.2	1.9	1.9	1.9	1.9	1.9
GMB	Columbian sharp-tailed grouse	EEIS BLM/FS	1.3	4.8	4.6	4.7	4.2[4]	4.0[4]	4.2[4]	4.1[4]	4.4
		EEIS CumEff	1.2	4.6	4.6	4.6	4.1[4]	3.9[4]	4.1[4]	3.9[4]	4.3
		UCRB BLM/FS	1.4	4.6	4.6	4.6	4.1[4]	4.0[4]	4.1[4]	4.1[4]	4.4
		UCRB CumEff	1.3	4.6	4.5	4.5	4.1	4.1[4]	4.0[4]	4.1[4]	4.3
GMB	Mountain quail	EEIS BLM/FS	2.5	3.9	4.0	3.9	3.9	3.5	3.8	3.5	3.6
		EEIS CumEff	2.4	3.7	3.8	3.7	3.6	3.5	3.6	3.4	3.6
		UCRB BLM/FS	3.4	4.8	4.7	4.7	4.6	4.4	4.6	4.4	4.6
		UCRB CumEff	3.2	4.7	4.7	4.7	4.5	4.3	4.5	4.3	4.5
GMB	Sage grouse	EEIS BLM/FS	1.6	3.2	3.4	3.3	2.8	2.3[4]	2.6[4]	2.2[4]	2.6[4]
		EEIS CumEff	1.6	3.1	3.4	3.3	2.8	2.3[4]	2.7	2.2[4]	2.6[4]
		UCRB BLM/FS	1.6	3.1	3.3	3.2	2.7	2.2[4]	2.6[4]	2.2[4]	2.6
		UCRB CumEff	1.5	3.1	3.3	3.2	2.8	2.3[4]	2.7	2.2[4]	2.6
RAP	Bald eagle	EEIS BLM/FS	2.8	3.6	3.4	3.1	3.0[4]	2.9[4]	3.0[4]	2.9[4]	3.0[4]
		EEIS CumEff	2.6	3.7	3.5	3.1[4]	3.0[4]	2.9[4]	3.0[4]	2.9[4]	2.9[4]
		UCRB BLM/FS	2.8	3.6	3.4	3.1	3.0[4]	2.9[4]	3.0[4]	2.9[4]	3.0[4]
		UCRB CumEff	2.6	3.7	3.5	3.1[4]	3.0[4]	2.9[4]	3.0[4]	2.9[4]	2.9
RAP	Barred owl	EEIS BLM/FS	3.3	2.2	2.5	2.9[4]	3.1[4]	3.2[4]	3.1[4]	3.1[4]	2.3
		EEIS CumEff	4.8	2.4	2.5	3.0[4]	2.9[4]	2.9[4]	2.9[4]	2.9[4]	2.6
		UCRB BLM/FS	3.0	2.9	2.4[4]	2.5	2.5	2.5	2.3[4]	2.5	2.2[4]
		UCRB CumEff	4.9	3.2	2.3[4]	2.5[4]	2.5[4]	2.4[4]	2.5[4]	2.4[4]	2.3[4]
RAP	Boreal owl	EEIS BLM/FS	4.1	4.2	4.3	4.2	4.0	4.0	4.1	4.0	3.7[4]
		EEIS CumEff	4.2	4.2	4.3	4.2	4.2	4.2	4.2	4.2	3.9
		UCRB BLM/FS	2.9	3.7	3.6	3.5	3.2[4]	3.2[4]	3.2[4]	3.1[4]	3.0[4]
		UCRB CumEff	3.3	3.7	3.5	3.5	3.3	3.3	3.4	3.3	3.2[4]
RAP	Burrowing owl	EEIS BLM/FS	1.5	3.0	3.0	3.0	2.9	2.8	2.9	2.8	2.9
		EEIS CumEff	1.3	2.8	2.9	2.9	2.9	2.8	2.8	2.8	2.9
		UCRB BLM/FS	1.5	2.9	3.0	3.0	2.9	2.8	2.8	2.8	2.9
		UCRB CumEff	1.4	2.8	2.9	2.9	2.8	2.8	2.8	2.7	2.9
RAP	Cooper's hawk	EEIS BLM/FS	1.8	2.4	2.5	2.4	2.1	1.9	2.1	1.9	2.0
		EEIS CumEff	1.7	2.2	2.3	2.2	1.9	1.7	1.9	1.7	1.9
		UCRB BLM/FS	1.8	2.4	2.4	2.4	2.0	1.9	2.0	1.9	2.0
		UCRB CumEff	1.7	2.3	2.3	2.3	1.9	1.8	1.9	1.8	1.9
RAP	Ferruginous hawk	EEIS BLM/FS	2.3	3.0	3.0	2.9	2.7	2.5	2.7	2.5[4]	2.6
		EEIS CumEff	2.2	2.8	2.7	2.7	2.6	2.5	2.6	2.4	2.5
		UCRB BLM/FS	2.3	3.0	3.0	3.0	2.7	2.5	2.7	2.5[4]	2.6
		UCRB CumEff	2.2	2.8	2.7	2.7	2.6	2.5	2.6	2.4	2.5

Table 4.12 (continued)

Group[1]	Species Name	Area[2]	Period / Alternative[3]								
			H	C	A1	A2	A3	A4	A5	A6	A7
RAP	Flammulated owl	EEIS BLM/FS	2.2	3.8	4.2	3.7	3.1[4]	2.9[4]	3.1[4]	3.0[4]	3.3
		EEIS CumEff	2.2	3.8	4.2	3.7	3.1[4]	2.9[4]	3.1[4]	3.0[4]	3.3
		UCRB BLM/FS	2.2	3.8	4.2	3.7	3.1[4]	2.9[4]	3.1[4]	3.0[4]	3.3
		UCRB CumEff	2.2	3.8	4.2	3.7	3.1[4]	2.9[4]	3.1[4]	3.0[4]	3.3
RAP	Great gray owl	EEIS BLM/FS	3.4	3.7	3.8	3.7	3.6	3.5	3.6	3.5	3.6
		EEIS CumEff	3.3	3.6	3.7	3.7	3.4	3.4	3.4	3.4	3.5
		UCRB BLM/FS	3.0	3.5	3.4	3.3	3.1		3.1		3.1
		UCRB CumEff	2.9	3.5	3.3	3.3	3.1	3.0	3.1	3.0	3.1
RAP	Long-eared owl	EEIS BLM/FS	3.1	3.6	3.7	3.7	3.4	3.2	3.3	3.2	3.5
		EEIS CumEff	3.0	3.3	3.5	3.5	3.2	3.1	3.2	3.1	3.4
		UCRB BLM/FS	3.1	3.6	3.7	3.7	3.4	3.3	3.4	3.3	3.6
		UCRB CumEff	3.0	3.4	3.6	3.6	3.3	3.2	3.4	3.2	3.5
RAP	Merlin	EEIS BLM/FS	2.9	3.1	3.3	3.3	3.1	3.0	3.1	3.0	3.1
		EEIS CumEff	2.8	3.0	3.1	3.1	3.0	3.0	3.0	2.9	3.1
		UCRB BLM/FS	2.9	3.1	3.1	3.2	3.0	2.9	3.0	2.9	3.0
		UCRB CumEff	2.8	3.0	3.0	3.1	2.9	2.9	3.0	2.9	3.0
RAP	Northern goshawk	EEIS BLM/FS	2.1	2.5	2.7	2.7	2.5	2.3	2.5	2.2	2.4
		EEIS CumEff	2.1	2.4	2.6	2.6	2.4	2.2	2.4	2.1	2.3
		UCRB BLM/FS	2.1	2.6	2.6	2.6	2.5	2.2	2.5	2.2	2.3
		UCRB CumEff	2.1	2.5	2.5	2.5	2.4	2.2	2.4	2.2	2.3
RAP	Northern pygmy-owl	EEIS BLM/FS	1.4	1.6	1.7	1.6	1.5	1.4	1.5	1.4	1.5
		EEIS CumEff	1.3	1.6	1.7	1.6	1.5	1.4	1.5	1.4	1.5
		UCRB BLM/FS	1.3	1.6	1.7	1.6	1.5	1.4	1.5	1.4	1.5
		UCRB CumEff	1.3	1.6	1.7	1.5	1.5	1.4	1.5	1.4	1.5
RAP	Northern saw-whet owl	EEIS BLM/FS	1.3	1.7	1.8	1.7	1.6	1.5	1.6	1.4	1.6
		EEIS CumEff	1.3	1.7	1.8	1.7	1.6	1.5	1.6	1.4	1.6
		UCRB BLM/FS	1.3	1.7	1.8	1.7	1.6	1.5	1.6	1.4	1.6
		UCRB CumEff	1.2	1.7	1.7	1.7	1.6	1.4	1.6	1.4	1.5
RAP	Swainson's hawk	EEIS BLM/FS	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8
		EEIS CumEff	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.9
		UCRB BLM/FS	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8
		UCRB CumEff	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.9
RAP	Western screech owl	EEIS BLM/FS	2.4	2.8	2.9	2.8	2.7	2.6	2.7	2.5	2.6
		EEIS CumEff	2.4	2.8	2.9	2.8	2.7	2.5	2.6	2.5	2.5
		UCRB BLM/FS	2.4	2.8	2.9	2.8	2.7	2.6	2.7	2.5	2.6
		UCRB CumEff	2.4	2.8	2.9	2.8	2.7	2.5	2.6	2.5	2.6

[1]Group: GMB - gamebird; RAP - raptor.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[4]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table may be misleading.

Great gray owl. Great gray owls occur throughout the Basin where habitat exists. They use nest trees in a variety of habitats, but most are located in mature or older stands of mixed-conifer (Bull and Henjum 1990). Natural nest sites are most frequently in large-diameter (> 20 inches dbh) dead trees in cavities or on stick platforms (Bull and Henjum 1990). They forage in open forests which may be partially logged or unlogged. Down woody material appears to be an important component of foraging habitat (Bull and Henjum 1990). Meadows adjoining forests also appear to provide important foraging habitat (Forsman and Bryan 1987). Great gray owls were likely never broadly distributed, but rather, occurred in a patchy distribution with interaction among local populations. Habitat has declined from historic conditions resulting in a pattern of more isolated habitat patches (table 4.11). Declines have been greatest in the UCRB EIS area where old forest is projected to have declined more substantially. Little change in habitat outcomes is projected under Alternatives 1 and 2, with more improvement projected under Alternatives 3 through 6. Management proposed under these alternatives would restore vegetation to natural patterns favorable to great gray owls. The outcome of Alternative 7 is less certain because of the potential for catastrophic fires in reserves. The likelihood of local extirpations would remain (> 10%) under Alternatives 1, 2 and 7 in the EEIS area.

Long-eared owl. Long-eared owls typically nest in willows, cottonwoods, and junipers adjacent to shrubland (Craig and Trost 1979, Marks 1986, Marks and Yensen 1980, Thurow and White 1984), or in ponderosa pine or mixed-conifer forests. Foraging habitat is primarily open forests (Bull and others 1989) and shrub habitats. These habitats have likely declined from historic condition with current habitat occurring in a patchy pattern. This pattern creates the potential for population isolation. Alternatives 3 through 7 propose management practices that focus on restoration of natural vegetative patterns and are projected to reverse the declining trend.

Northern pygmy-owl and northern saw-whet owl. Northern pygmy-owls and northern saw-whet owls have similar habitat associations, using mid- to late-seral mixed conifer and ponderosa pine forests in summer and shrubby and riparian vegetation in winter. Both species of owls are secondary cavity nesters in snags. They are broadly distributed within the Basin, but habitat has likely declined moderately from historic conditions for both species, resulting in a pattern of larger habitat gaps (table 4.11). Little change from current conditions is projected for Alternatives 1 and 2, while Alternatives 3 through 7 are projected to restore more broadly distributed habitat. The restoration emphasis of Alternatives 4 and 6 is projected to be most positive. Local population isolation or extirpation is unlikely under any alternative.

Western screech owl. Western screech owls occupy riparian deciduous habitat throughout the Basin. Declines from historic conditions in this habitat are projected to have resulted in a pattern of increasing patchiness and increasing isolation of screech owl habitat and populations. These trends are projected to continue under Alternative 1. Moderate improvement is projected under other alternatives. There is little likelihood of local population isolation or extirpation under any alternative.

Woodpeckers, nuthatches, and swifts

Introduction—The ICBEMP assessment area database lists 14 species of woodpeckers, 3 species of nuthatches, and 3 species of swifts that occur within the Basin. We selected nine species of woodpeckers, two species of nuthatches, and one species of swift for viability assessments. We recommend that assessment of two species of woodpeckers (yellow-bellied sapsucker and red-breasted sapsucker) be conducted at a fine scale because of their local distributions within the Basin. In all cases, species were selected for assessment because their habitats were projected to decline under at least one of the alternatives. Two of the species originally assessed in this group (western bluebird and chestnut-backed chickadee) were moved to the passerine group for analysis and are not included here.

Methods—We used standard methods, as outlined in overall methods (Methods for Assessing Effects on Terrestrial Species), for the assessment of woodpeckers, nuthatches, and swifts. Because all of these species are cavity nesters, we paid special attention to provisions for the conservation and management of snags and cavity-bearing trees under each preliminary draft EIS alternative. We could not predict actual numbers of snags that might be present under the alternatives. Instead, we relied on the general direction for snag management and assumptions for habitat response, based on degree of emphasis on snag management under each alternative, coupled with projections of amounts of suitable habitat for each species. In addition, several of the species are known to use very large-diameter snags and these snags might not be fully represented under the 100-year timeframe of the projections. Therefore, we extended the time from the normal 100 years to more than 200 years to allow more time for development of large-diameter snags under the alternatives. We modified panel results for four species (Vaux's swift, pileated woodpecker, white-headed woodpecker, and downy woodpecker) based on our interpretation of key features of particular alternatives, our interpretation of the panelist's intent as recorded in the panel notes, and additional clarification about snag management practices proposed under the alternatives that was made available by the landscape analysis team after the panel deliberations.

Results—Results of the viability assessment for the 12 species of woodpeckers, nuthatches, and swifts are listed in tables 4.13 and 4.14. Habitat conditions on federally administered lands were generally judged to be similar between the EEIS and UCRB EIS planning areas. Habitat conditions for the 12 species were not projected to attain Outcome 1 under historic, current, or future periods in either the EEIS or UCRB areas (table 4.14 and fig. 4.22). We judged that habitat conditions of nine species attained Outcome 2 under historic conditions and that habitat for one species (hairy woodpecker) is currently at that level. No species were judged to attain Outcome 2 under Alternatives 1 and 5 (fig. 4.22). Habitat conditions of the Vaux's swift had the lowest outcomes, averaging close to Outcome 4 for all alternatives except Alternative 7, which was projected to support Outcome 3. Habitat outcomes for the white-headed woodpecker were close to Outcome 4 for current conditions and for Alternatives 1 through 3, and averaged closer to Outcome 3 for Alternatives 4 through 7.

Weighted average outcomes, averaged among the 12 species (fig. 4.23), were highest for the historic period, averaging between Outcomes 2 and 3. Current outcomes were lower than historic levels and averaged slightly above Outcome 3; average outcomes were lower than current for Alternatives 2 and 5, were similar to current for Alternatives 2 and 3, and were higher than current for Alternatives 4, 6, and 7 (fig. 4.23).

Compared with current habitat conditions, weighted average outcomes for habitat conditions on Federal lands in the EEIS area were projected to increase by at least 0.5 for four species under Alternatives 4, 6, and 7, and to decrease by that amount for nine species under Alternative 1 and for two species under Alternative 5 (fig. 4.24). Habitat outcomes showed little change from current conditions under Alternatives 2 and 3. In the UCRB EIS area, the pattern was identical to that of the EEIS area for Alternatives 2, 3, 4, 6, and 7. Habitat outcomes for ten species are projected to decrease from current conditions under Alternative 1 and for one species under Alternative 5.

Discussion—The general pattern of habitat response under the scenarios we evaluated primarily reflects the likely distribution and abundance of snags suitable for nesting. According to the assumptions for habitat response that were prepared by the ICBEMP Science Team and EIS teams, Alternatives 1 through 7 are expected to have the following levels of emphasis and projected trends for snags:

Alternative						
1	2	3	4	5	6	7
N (—)	L (-)	M (0)	H (+)	M (0)	H (++)	M (0)

where: N = None, L = Low, M = Moderate, H = High; 0 = stable projected trend, + = upward trend, ++ = strong upward trend, - = downward trend, and — = strong downward trend. A comparison of these estimates with the average outcomes for the 12 species (fig. 4.23) shows a general concordance, except that the outcomes for Alternative 7, for which habitat response was assumed to be moderate with stable trend, were comparable to those of Alternatives 4 and 6. Alternatives 4 and 6 had high emphasis on snag habitat. Outcomes were greater for Alternative 7 because the reserve system and retention of all late-seral forest stands outside of reserves under this alternative would likely lead to greater numbers of large-diameter snags over the long run.

Habitat conditions of three species, white-headed woodpecker, Vaux's swift, and Lewis' woodpecker, were projected to decrease to Outcome 4 under some of the alternatives. The white-headed woodpecker is strongly associated with large-diameter ponderosa pines which it uses for foraging and nesting (Bull 1980; Dixon 1995; Garrett and others, in press; Milne and Hejl 1989). Under current conditions, stands of mature ponderosa pine are small and disjunct resulting in small and isolated subpopulations. Projected habitat conditions are expected to resemble current conditions under Alternatives 1, 2, and 3, but are expected to increase under Alternatives 4 through 7. This would especially be true under Alternatives 4 and 6 which place greater emphasis on restoration of late-seral lower montane forest (table 4.14).

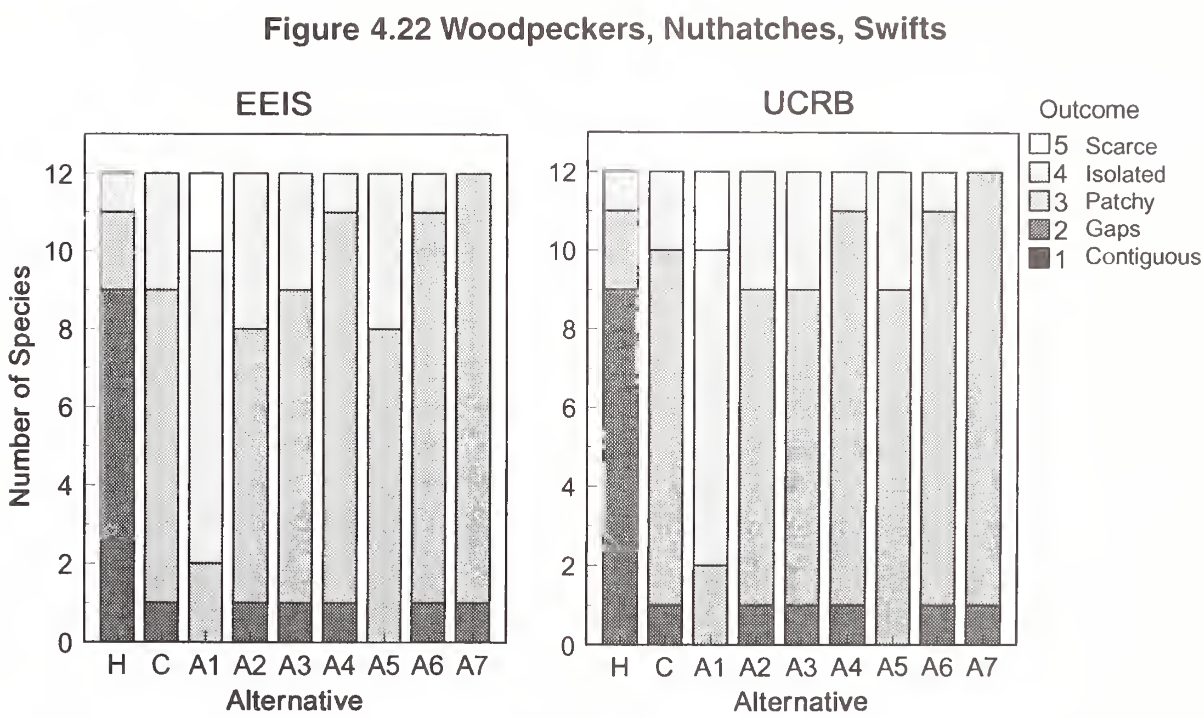

Figure 4.22. Frequency distribution of mean habitat outcome scores for 12 species of woodpeckers, nuthatches, and swifts on Federal lands in the EEIS and UCRB planning areas for historic, current and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

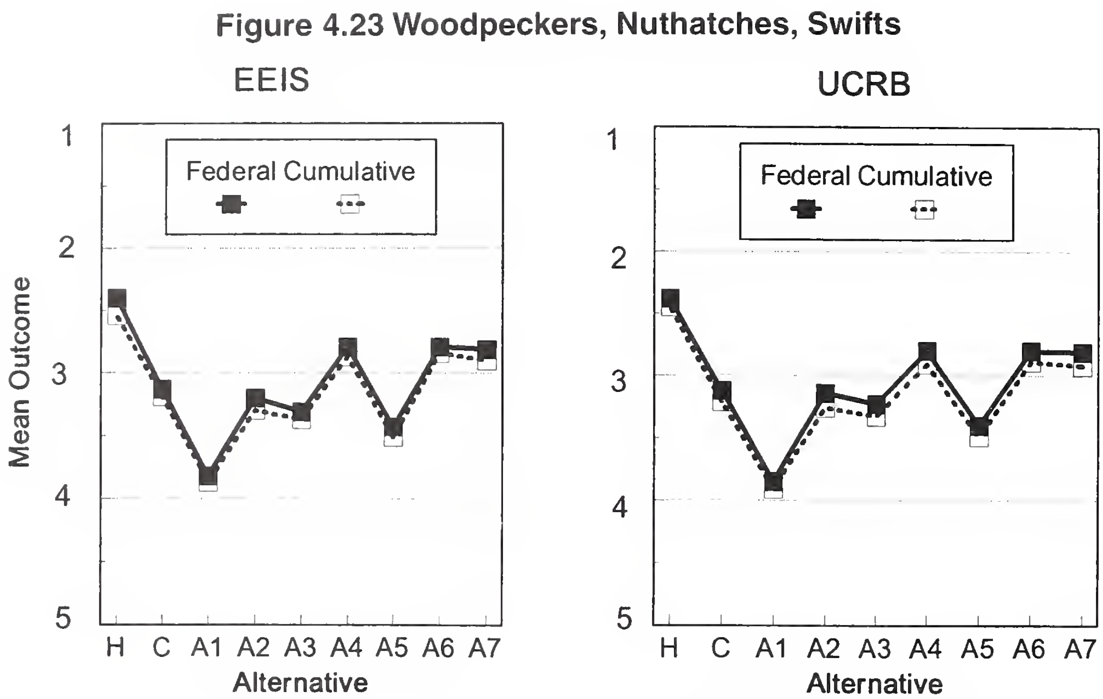

Figure 4.23. Mean outcome scores averaged over 12 species of woodpeckers, nuthatches, and swifts in the EEIS and UCRB planning areas for historic, current, and future conditions under seven alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

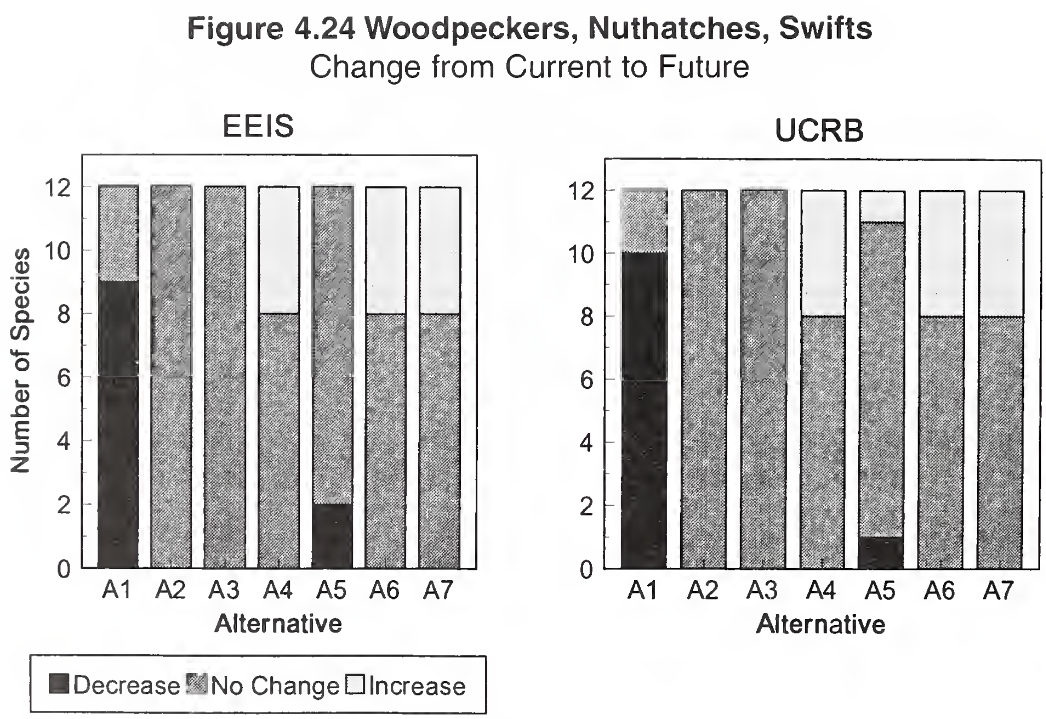

Figure 4.24. Departure of habitat outcomes on Federal lands from current conditions under each alternative for 12 species of woodpeckers, nuthatches, and swifts in the EEIS and UCRB planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

Table 4.13. Mean likelihood scores of viability outcomes for woodpeckers, nuthatches, and swifts for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means are calculated from the individual likelihood scores of panelists.

			Period / Alternative[3]								
Species Name	Area[1]	Outcome[2]	H	C	A1	A2	A3	A4	A5	A6	A7
Black-backed woodpecker	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	80	3	0	8	8	15	0	15	15
		3	20	83	19	68	58	73	51	73	80
		4	0	15	58	25	35	13	46	13	5
		5	0	0	24	0	0	0	3	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	80	0	0	5	5	13	0	13	13
		3	20	80	16	65	55	70	46	70	73
		4	0	20	55	30	40	18	49	18	15
		5	0	0	29	0	0	0	5	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	80	5	4	15	10	23	5	25	23
		3	20	80	16	70	64	68	44	65	73
		4	0	15	59	15	26	10	49	10	5
		5	0	0	21	0	0	0	3	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	80	0	0	8	5	13	0	15	15
		3	20	80	15	70	63	68	41	65	70
		4	0	20	59	23	33	20	54	20	15
		5	0	0	26	0	0	0	5	0	0
Downy woodpecker	EEIS BLM/FS[4]	1	25	0	0	0	0	0	0	0	0
		2	75	30	10	23	18	25	13	28	18
		3	0	70	70	73	78	73	65	70	78
		4	0	0	20	5	5	3	23	3	5
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff[4]	1	25	0	0	0	0	0	0	0	0
		2	75	25	15	18	18	25	15	28	23
		3	0	75	75	80	80	73	70	73	75
		4	0	0	10	3	3	3	15	0	3
		5	0	0	0	0	0	0	0	0	0
	UCRB BLM/FS[4]	1	25	0	0	0	0	0	0	0	0
		2	75	33	3	28	25	25	20	28	13
		3	0	68	75	68	70	73	58	70	80
		4	0	0	23	5	5	3	23	3	8
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff[4]	1	25	0	0	0	0	0	0	0	0
		2	75	30	3	28	25	25	20	28	13
		3	0	70	80	68	70	73	63	73	80
		4	0	0	18	5	5	3	18	0	8
		5	0	0	0	0	0	0	0	0	0
Hairy woodpecker	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	88	80	45	65	58	58	43	60	80
		3	13	20	55	35	43	43	58	40	20
		4	0	0	0	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0

Table 4.13 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3]								
			H	C	A1	A2	A3	A4	A5	A6	A7
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	85	89	43	53	58	60	43	60	70
		3	15	11	58	48	43	40	58	40	30
		4	0	0	0	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	88	85	50	66	55	60	45	65	83
		3	13	15	50	34	45	40	55	35	18
		4	0	0	0	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	88	85	45	55	60	63	45	65	75
		3	13	15	55	45	40	38	55	35	25
		4	0	0	0	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
Lewis' woodpecker	EEIS BLM/FS	1	10	0	0	0	0	0	0	0	0
		2	47	10	0	0	0	53	0	47	43
		3	43	27	0	47	55	40	23	47	53
		4	0	63	50	53	45	7	60	7	3
		5	0	0	50	0	0	0	17	0	0
	EEIS CumEff	1	10	0	0	0	0	0	0	0	0
		2	27	10	0	0	0	17	0	17	17
		3	47	17	0	17	35	70	0	67	67
		4	17	47	23	70	58	13	40	17	17
		5	0	27	77	13	7	0	60	0	0
	UCRB BLM/FS	1	15	0	0	0	0	0	0	0	0
		2	45	15	0	0	0	45	0	40	35
		3	40	30	0	60	80	45	25	50	60
		4	0	55	50	40	20	10	50	10	5
		5	0	0	50	0	0	0	25	0	0
	UCRB CumEff	1	15	0	0	0	0	0	0	0	0
		2	15	15	0	0	0	0	0	0	0
		3	45	15	0	20	35	80	0	75	75
		4	25	30	25	60	55	20	45	25	25
		5	0	40	75	20	10	0	55	0	0
Pileated woodpecker	EEIS BLM/FS[4]	1	0	0	0	0	0	0	0	0	0
		2	25	10	0	0	0	50	0	50	47
		3	43	40	3	47	47	50	80	50	53
		4	32	50	97	53	53	0	13	0	0
		5	0	0	0	0	0	0	7	0	0
	EEIS CumEff[4]	1	0	0	0	0	0	0	0	0	0
		2	25	10	0	0	0	50	0	50	47
		3	43	40	3	47	47	50	80	50	53
		4	32	50	97	53	53	0	13	0	0
		5	0	0	0	0	0	0	7	0	0
	UCRB BLM/FS[4]	1	0	0	0	0	0	0	0	0	0
		2	25	15	0	0	0	50	0	50	45
		3	50	35	3	45	45	50	85	50	55
		4	25	50	97	55	55	0	10	0	0
		5	0	0	0	0	0	0	5	0	0

Table 4.13 (continued)

Species Name	Area[1]	Outcome[2]	H	C	A1	A2	A3	A4	A5	A6	A7
			Period / Alternative[3]								
	UCRB CumEff[4]	1	0	0	0	0	0	0	0	0	0
		2	25	15	0	0	0	50	0	50	45
		3	50	35	3	45	45	50	85	50	55
		4	25	50	97	55	55	0	10	0	0
		5	0	0	0	0	0	0	5	0	0
Pygmy nuthatch	EEIS BLM/FS	1	0	0	0	0	0	3	0	3	0
		2	88	13	0	18	15	40	15	40	20
		3	13	88	43	60	58	58	43	58	78
		4	0	0	55	23	25	0	40	0	3
		5	0	0	3	0	3	0	3	0	0
	EEIS CumEff	1	0	0	0	0	0	3	0	3	0
		2	88	13	0	18	15	40	15	40	20
		3	13	88	43	60	58	58	43	58	78
		4	0	0	55	23	25	0	40	0	3
		5	0	0	3	0	3	0	3	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	88	3	0	18	15	40	15	40	20
		3	13	98	43	60	55	60	43	60	78
		4	0	0	55	23	30	0	43	0	3
		5	0	0	3	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	88	3	0	18	15	40	15	40	20
		3	13	98	43	60	55	60	43	60	78
		4	0	0	55	23	30	0	43	0	3
		5	0	0	3	0	0	0	0	0	0
Red-naped sapsucker	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	100	0	0	15	23	30	5	31	19
		3	0	75	45	73	65	70	58	69	56
		4	0	25	30	13	13	0	25	0	25
		5	0	0	25	0	0	0	13	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	100	0	0	10	18	25	3	26	14
		3	0	75	43	78	70	75	58	74	61
		4	0	25	33	13	13	0	28	0	25
		5	0	0	25	0	0	0	13	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	100	0	0	15	23	30	5	31	19
		3	0	75	45	73	65	70	58	69	56
		4	0	25	30	13	13	0	25	0	25
		5	0	0	25	0	0	0	13	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	100	0	0	10	18	25	3	26	14
		3	0	75	43	78	70	75	58	74	61
		4	0	25	33	13	13	0	28	0	25
		5	0	0	25	0	0	0	13	0	0
Three-toed woodpecker	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	45	10	0	8	10	5	0	13	15
		3	55	89	20	70	58	88	63	80	79
		4	0	1	60	23	33	8	38	8	6
		5	0	0	20	0	0	0	0	0	0

Species Name	Area[1]	Outcome[2]	H	C	A1	A2	A3	A4	A5	A6	A7
			Period / Alternative[3]								
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	45	10	0	8	10	5	0	13	15
		3	55	88	20	70	58	88	63	80	79
		4	0	3	60	23	33	8	38	8	6
		5	0	0	20	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	45	10	0	8	10	5	0	13	15
		3	55	89	20	75	63	88	63	80	81
		4	0	1	59	18	28	8	38	8	4
		5	0	0	21	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	45	10	0	8	10	5	0	13	15
		3	55	88	20	75	63	88	63	80	81
		4	0	3	59	18	28	8	38	8	4
		5	0	0	21	0	0	0	0	0	0
Vaux's swift	EEIS BLM/FS[4]	1	0	0	0	0	0	0	0	0	0
		2	3	0	0	0	0	3	0	0	10
		3	23	27	0	50	20	27	0	7	87
		4	40	73	50	47	43	67	75	87	3
		5	33	0	50	3	37	3	25	7	0
	EEIS CumEff[4]	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	3	0	0	20	0	10	0	3	63
		4	57	93	25	65	47	70	50	90	33
		5	40	7	75	15	53	20	50	7	3
	UCRB BLM/FS[4]	1	0	0	0	0	0	0	0	0	0
		2	10	0	0	0	0	3	0	0	10
		3	23	20	0	50	20	27	0	7	87
		4	33	80	50	47	47	70	75	87	3
		5	33	0	50	3	33	0	25	7	0
	UCRB CumEff[4]	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	10	0	0	20	0	10	0	3	63
		4	57	87	25	65	47	70	50	90	33
		5	33	13	75	15	53	20	50	7	3
White-breasted nuthatch	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	88	8	0	8	8	20	3	30	18
		3	13	88	43	80	63	80	53	70	75
		4	0	5	55	13	28	0	43	0	8
		5	0	0	3	0	3	0	3	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	88	8	0	8	8	23	3	33	18
		3	13	93	43	80	63	78	53	68	75
		4	0	0	55	13	28	0	43	0	8
		5	0	0	3	0	3	0	3	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	83	10	0	7	10	27	0	40	23
		3	17	90	37	90	73	73	62	60	60
		4	0	0	63	3	17	0	38	0	17
		5	0	0	0	0	0	0	0	0	0

Table 4.13 (continued)

Species Name	Area[1]	Outcome[2]	H	C	A1	A2	A3	A4	A5	A6	A7
			Period / Alternative[3]								
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	83	10	0	7	10	27	0	40	23
		3	17	90	37	90	73	73	62	60	60
		4	0	0	63	3	17	0	38	0	17
		5	0	0	0	0	0	0	0	0	0
White-headed woodpecker	EEIS BLM/FS[4]	1	0	0	0	0	0	0	0	0	0
		2	63	0	0	0	0	33	18	35	23
		3	38	35	2	28	30	68	30	65	48
		4	0	53	78	58	45	0	52	0	30
		5	0	13	20	15	25	0	0	0	0
	EEIS CumEff[4]	1	0	0	0	0	0	0	0	0	0
		2	63	0	0	0	0	25	15	30	20
		3	38	35	2	15	18	75	33	70	50
		4	0	53	65	70	58	0	52	0	30
		5	0	13	33	15	25	0	0	0	0
	UCRB BLM/FS[4]	1	0	0	0	0	0	0	0	0	0
		2	63	0	0	0	0	30	20	38	28
		3	38	33	2	30	33	70	30	63	43
		4	0	55	78	58	45	0	50	0	30
		5	0	13	20	13	23	0	0	0	0
	UCRB CumEff[4]	1	0	0	0	0	0	0	0	0	0
		2	63	0	0	0	0	25	18	15	25
		3	38	33	2	18	20	75	32	80	45
		4	0	55	70	70	58	0	50	5	30
		5	0	13	28	13	23	0	0	0	0
Williamson's sapsucker	EEIS BLM/FS	1	0	0	0	0	0	0	0	3	0
		2	88	10	0	8	10	28	5	28	25
		3	13	70	25	53	46	63	35	61	65
		4	0	20	55	40	41	10	53	9	10
		5	0	0	20	0	3	0	8	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	3	0
		2	88	10	0	8	10	25	5	25	25
		3	13	70	25	55	46	65	35	64	63
		4	0	20	53	38	39	10	50	9	13
		5	0	0	23	0	5	0	10	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	88	5	0	8	10	23	5	20	25
		3	13	75	28	73	53	55	38	59	65
		4	0	20	58	20	36	23	54	21	10
		5	0	0	15	0	1	0	4	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	88	5	0	8	10	23	5	20	25
		3	13	75	28	70	53	53	38	56	63
		4	0	20	55	23	34	25	54	24	13
		5	0	0	18	0	4	0	4	0	0

[1]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[2]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[4]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

Table 4.14. Mean viability outcomes for habitat and populations of cavity nesting woodpeckers, nuthcatches and swifts for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

		Period / Alternative[2]								
Species Name	Area[1]	H	C	A1	A2	A3	A4	A5	A6	A7
Black-backed woodpecker	EEIS BLM/FS	2.2	3.2	4.1[3]	3.2	3.3	3.0	3.5	3.0	2.9
	EEIS CumEff	2.2	3.2	4.1[3]	3.3	3.4	3.1	3.6	3.1	3.1
	UCRB BLM/FS	2.2	3.1	4.0[3]	3.0	3.2	2.9	3.5	2.9	2.9
	UCRB CumEff	2.2	3.2	4.1[3]	3.2	3.3	3.1	3.6	3.1	3.0
Downy woodpecker	EEIS BLM/FS[4]	1.8	2.7	3.1	2.9	2.9	2.8	3.1	2.8	2.9
	EEIS CumEff[4]	1.8	2.8	3.0	2.9	2.9	2.8	3.0	2.8	2.8
	UCRB BLM/FS[4]	1.8	2.7	3.2[3]	2.8	2.8	2.8	3.1	2.8	3.0
	UCRB CumEff[4]	1.8	2.7	3.2	2.8	2.8	2.8	3.0	2.8	3.0
Hairy woodpecker	EEIS BLM/FS	2.2	2.2	2.6	2.4	2.5	2.5	2.6	2.4	2.2
	EEIS CumEff	2.2	2.1	2.6	2.5	2.5	2.4	2.6	2.4	2.3
	UCRB BLM/FS	2.2	2.2	2.5	2.3	2.5	2.4	2.6	2.4	2.2
	UCRB CumEff	2.2	2.2	2.6	2.5	2.4	2.4	2.6	2.4	2.3
Lewis' woodpecker	EEIS BLM/FS	2.3	3.5	4.5[3]	3.5	3.5	2.5[3]	3.9	2.6[3]	2.6[3]
	EEIS CumEff	2.7	3.9	4.8[3]	4.0	3.7	3.0[3]	4.6[3]	3.0[3]	3.0[3]
	UCRB BLM/FS	2.3	3.4	4.5[3]	3.4	3.2	2.7[3]	4.0[3]	2.7[3]	2.7[3]
	UCRB CumEff	2.8	4.0	4.8[3]	4.0	3.8	3.2[3]	4.6[3]	3.3[3]	3.3[3]
Pileated woodpecker	EEIS BLM/FS[4]	3.1	3.4	4.0[3]	3.5	3.5	2.5[3]	3.3	2.5[3]	2.5[3]
	EEIS CumEff[4]	3.1	3.4	4.0[3]	3.5	3.5	2.5[3]	3.3	2.5[3]	2.5[3]
	UCRB BLM/FS[4]	3.0	3.4	4.0[3]	3.6	3.6	2.5[3]	3.2	2.5[3]	2.6[3]
	UCRB CumEff[4]	3.0	3.4	4.0[3]	3.6	3.6	2.5[3]	3.2	2.5[3]	2.6[3]
Pygmy nuthatch	EEIS BLM/FS	2.2	2.9	3.6[3]	3.1	3.2	2.6	3.3	2.6	2.9
	EEIS CumEff	2.2	2.9	3.6[3]	3.1	3.2	2.6	3.3	2.6	2.9
	UCRB BLM/FS	2.2	3.0	3.6[3]	3.1	3.2	2.6	3.3	2.6	2.9
	UCRB CumEff	2.2	3.0	3.6[3]	3.1	3.2	2.6	3.3	2.6	2.9
Red-naped sapsucker	EEIS BLM/FS	2.0	3.3	3.8[3]	3.0	2.9	2.7[3]	3.5	2.7[3]	3.1
	EEIS CumEff	2.0	3.3	3.9[3]	3.1	3.0	2.8[3]	3.6	2.7[3]	3.1
	UCRB BLM/FS	2.0	3.3	3.8[3]	3.0	2.9	2.7[3]	3.5	2.7[3]	3.1
	UCRB CumEff	2.0	3.3	3.9[3]	3.1	3.0	2.8[3]	3.6	2.7[3]	3.1
Three-toed woodpecker	EEIS BLM/FS	2.6	2.9	4.0[3]	3.2	3.3	3.1	3.4[3]	3.0	2.9
	EEIS CumEff	2.6	3.0	4.0[3]	3.2	3.3	3.1	3.4[3]	3.0	2.9
	UCRB BLM/FS	2.6	2.9	4.0[3]	3.1	3.2	3.1	3.4[3]	3.0	2.9
	UCRB CumEff	2.6	3.0	4.0[3]	3.1	3.2	3.1	3.4[3]	3.0	2.9
Vaux's swift	EEIS BLM/FS[4]	4.0	3.7	4.5[3]	3.5	4.2	3.7	4.3[3]	4.0	2.9[3]
	EEIS CumEff[4]	4.4	4.1	4.8	4.0	4.5	4.1	4.5	4.0	3.4
	UCRB BLM/FS[4]	3.9	3.8	4.5	3.5	4.1	3.7	4.3	4 0	2.9
	UCRB CumEff[4]	4.2	4.1	4.8	4.0	4.5	4.1	4.5	4.0	3.4
White-breasted nuthatch	EEIS BLM/FS	2.2	3.0	3.6[3]	3.1	3.3	2.8	3.5[3]	2.7	2.9
	EEIS CumEff	2.2	3.0	3.6[3]	3.1	3.3	2.8	3.5[3]	2.7	2.9
	UCRB BLM/FS	2.2	2.9	3.6[3]	3.0	3.1	2.7	3.4	2.6	2.9
	UCRB CumEff	2.2	2.9	3.6[3]	3.0	3.1	2.7	3.4	2.6	2.9
White-headed woodpecker	EEIS BLM/FS[4]	2.4	3.8	4.2	3.9	4.0	2.7[3]	3.3	2.7[3]	3.1[3]
	EEIS CumEff[4]	2.4	3.8	4.3	4.0	4.1	2.8[3]	3.4	2.7[3]	3.1[3]
	UCRB BLM/FS[4]	2.4	3.8	4.2	3.9	3.9	2.7[3]	3.3[3]	2.7[3]	3.1[3]
	UCRB CumEff[4]	2.4	3.8	4.3	4.0	4.1	2.8[3]	3.3[3]	2.9[3]	3.1[3]

Table 4.14 (continued)

Species Name	Area[1]	H	C	A1	A2	A3	A4	A5	A6	A7
		Period / Alternative[2]								
Williamson's sapsucker	EEIS BLM/FS	2.2	3.1	4.0[3]	3.4	3.4	2.9	3.7[3]	2.8	2.9
	EEIS CumEff	2.2	3.1	4.0[3]	3.3	3.4	2.9	3.7[3]	2.8	2.9
	UCRB BLM/FS	2.2	3.2	3.9[3]	3.2	3.3	3.0	3.6	3.0	2.9
	UCRB CumEff	2.2	3.2	3.9[3]	3.2	3.4	3.1	3.6	3.0	2.9

[1]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[2]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[3]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table may be misleading.

[4]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

Vaux's swifts nest in large-diameter snags and hollow trees, especially grand fir (Bull and Collins 1993, Bull and Hohmann 1993). Suitable nesting habitat is distributed in disjunct patches and is projected to remain so under nearly all alternatives (table 4.14). Alternative 7, with its system of reserves and retention of late-seral patches of forest, is expected to result in improved distribution of nesting habitat with larger patches containing large-diameter trees for nesting. The Vaux's swift had lower outcomes under the cumulative effects analysis (table 4.14). Unlike most other cavity-nesting species that are permanent residents, Vaux's swift is a migrant and is influenced by loss of habitat on the wintering grounds.

Lewis' woodpeckers nest in large-diameter cottonwoods along permanently-flowing streams and in mature, decayed trees in upland sites (Bock 1970, Galen 1989, Marshall 1992, Raphael and White 1984). Therefore, Alternatives 1 and 5, which have limited riparian buffers, were projected to provide more isolated and smaller patches of nesting habitat than current. Alternatives 4, 6, and 7 were projected to improve distribution of habitat to near historic levels. The cumulative effects analysis showed greater risk due to the likely increased loss of suitable nesting habitat along streams on non-Federal lands.

Cuckoos, hummingbirds, and passerines

Introduction—The ICBEMP assessment database lists 174 species of cuckoos, hummingbirds, and passerines that occur within the Basin. Using the methods outlined above (Methods for Assessing Effects on Terrestrial Species), we selected 36 species for viability assessments. We recommend that assessment of five species (black-chinned sparrow, clay-colored sparrow, hermit warbler, least flycatcher, and tricolored blackbird) be conducted at a fine scale because of their local distributions within the Basin. Species were selected for assessment because of known population declines or because their habitats were projected to decline under at least one of the alternatives. We included two species (western bluebird and chestnut-backed chickadee) in this group that were actually assessed by the woodpeckers, nuthatches, and swifts panel.

Methods—We used standard methods, as outlined in the methods section of this chapter, for the assessment of cuckoos, hummingbirds and passerines. Because of the large number of species involved, we grouped species into their general habitat associations. We grouped 13 species associated with coniferous forest habitat, 4 species as woodland habitat associates, 7 species as riparian

habitat associates, and 12 species as grass/shrub habitat associates (table 4.15). One of the forest species, broad-tailed hummingbird, occurs only in the UCRB area and was not analyzed for the EEIS area. We did not adjust original outcome scores for any of the species.

Results—Results of the viability assessment for the 36 species are listed in tables 4.15 and 4.16. For the combined set of birds in this group, mean outcomes were generally similar between the EEIS and UCRB EIS planning areas (fig. 4.25). In addition, the difference in mean outcome between assessments on Federal lands and the cumulative effects assessment averaged about 0.25 outcome units for each alternative (fig. 4.25). Mean outcomes under all of the alternatives were judged to be lower than under historic conditions and were similar to current conditions. Alternatives 1 and 5 had lower mean outcomes than any of the other alternatives, but mean differences were small (fig. 4.25).

Forest birds. Among forest birds, one species (western tanager) was judged to have broadly distributed habitat (Outcome 1) under all of the alternatives. Another (rufous-sided towhee) was judged to have habitat conditions typical of Outcome 2 under historic conditions and under all alternatives except Alternatives 4, 6, and 7 (table 4.16). We judged that no species had outcomes lower than Outcome 3 historically, and that Alternatives 4, 6, and 7 would not result in species with outcomes lower than 3. Alternatives 1 and 5 would have 5 species at Outcome 4 in the EEIS planning (fig. 4.26). The UCRB planning area had similar patterns.

Figure 4.25 Cuckoos, Hummingbirds, Passerines

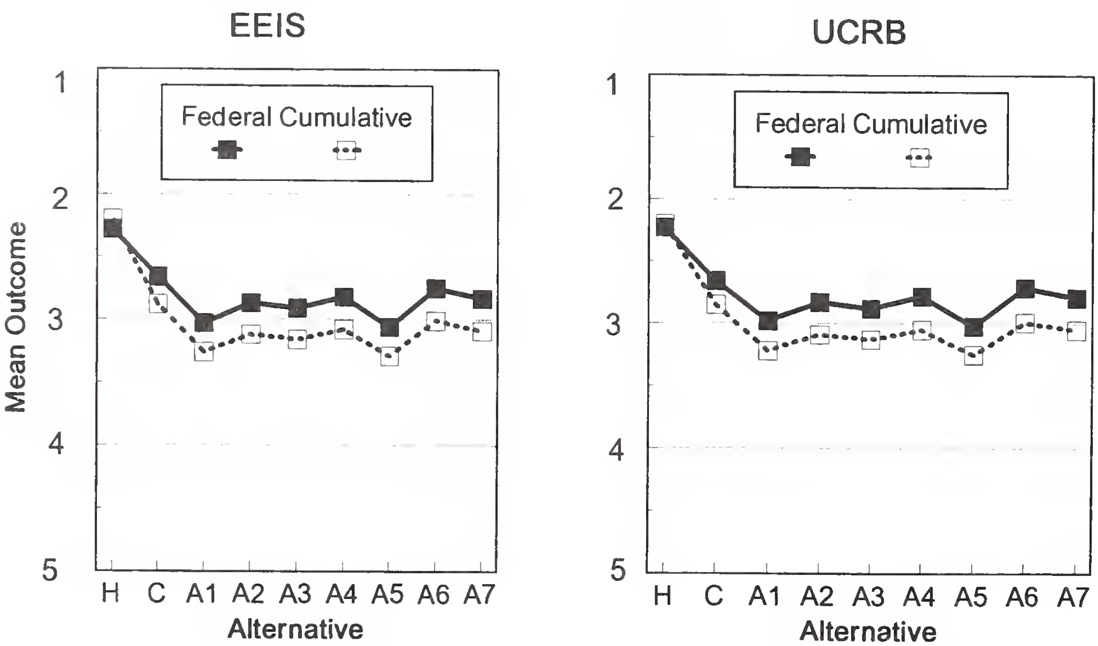

Figure 4.25. Mean outcome scores averaged over 36 species of cuckoos, hummingbirds, and passerines in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Mean outcomes were judged to be about 2.5 (between Outcomes 2 and 3) historically and were lowest under Alternatives 1 and 5 in both planning areas (fig. 4.27). Compared with current habitat conditions, habitat decreased in the EEIS area by at least 0.5 outcome units for three species under Alternative 1 and for two species under Alternative 5. In the UCRB EIS area, habitat conditions decreased for two species under Alternative 1, and for one species under Alternative 5 (fig. 4.28). In both planning areas, habitat conditions were judged to have increased for one or more species under Alternatives 4, 6, and 7.

Woodland birds. Woodland birds were generally judged to have future habitat conditions under each of the alternatives similar to those of historic and current periods (tables 4.15 and 4.16). Except for Alternatives 4 and 6, all alternatives would provide habitat conditions of Outcome 3 or better (fig. 4.29). In Alternatives 4 and 6, habitat of one species (bushtit) that is associated with juniper woodlands declined to Outcome 4 in both planning areas (table 4.16). Habitat of the chipping sparrow was distributed in Outcome 1 historically, currently, and under all alternatives. Outcomes under the cumulative effects analysis were slightly lower than those of the Federal habitat analysis (fig. 4.30).

Riparian birds. Current and future habitat condition for riparian birds was judged to have declined from historic conditions. Historically, habitat was distributed in Outcomes 2 and 3 for all seven species. Current and future habitat condition under the alternatives is mostly in Outcomes 3, 4, and 5 (fig. 4.31). Compared to current habitat, distribution of habitat under the alternatives was not projected to increase or decline by more than 0.5 outcome units. Overall, mean outcomes were between Outcomes 3 and 4 for this group of birds. Projected mean outcomes were lowest under Alternatives 1 and 5 and highest under Alternatives 4 and 6 (fig. 4.32). Outcomes for the cumulative effects analysis were lower than outcomes for the Federal habitat assessment under current conditions and under each of the alternatives.

Grassland/shrubland birds. Of the 12 species of grassland/shrubland birds, nine were judged to have habitat conditions of Outcome 3 or better under each of the alternatives. We estimated that seven species had historic habitat conditions in Outcome 1 in both planning areas (fig. 4.33). We estimated that eight species had current habitat conditions in Outcome 1 in the EEIS area and that five species had Outcome 1 in the UCRB EIS area. In the EEIS area, three species had habitat conditions in Outcomes 4 or 5 under all of the alternatives. In the UCRB EIS area, all three species were projected to have habitat conditions in Outcome 4 under all alternatives (fig. 4.33). Mean habitat outcomes among all the species were projected as Outcome 2 historically, were estimated as slightly lower currently, and were projected to be greater than 0.5 units lower under each of the alternatives (fig. 4.34). Compared with current habitat, habitat was projected to decrease by more than 0.5 units for four to six species under the alternatives in each planning area. Habitat was not expected to increase for any species from current conditions (fig. 4.35).

Discussion—

Comparisons among habitats. Several general patterns are apparent within the group of cuckoos, hummingbirds, and passerines. First, species associated with riparian habitats had lower mean outcome scores than were typical of other species groups, reflecting the more patchy and disjunct distribution of riparian habitat compared with other upland habitats. Alternatives that would provide wider riparian buffers (Alternatives 2, 3, 4, 6, and 7) had higher average scores than alternatives that would provide smaller buffers (Alternatives 1 and 5). In addition, provisions for modifying grazing practices that might interfere with aquatic conservation objectives led to increased outcome scores for species associated with shrub habitats within the riparian zones. One species in this group, the yellow-billed cuckoo, occurs as extremely disjunct and small populations and its habitat (both current and projected under the alternatives) is distributed in Outcome 5. This

species occurs in scattered locations within the planning areas, and is associated with large cottonwood trees with dense shrubby understories (Laymon 1987; Marshall 1992; Saab and Rich, in press). The species is at risk due to pesticide spraying (Laymon 1987) and has undergone a long-term population decline (Marshall 1992; Saab and Rich, in press).

Second, birds associated with woodland habitat had generally higher scores than those of birds associated with other habitats in this group. Birds associated with woodland habitat tend to have generalized habitat associations. The amount of upland woodland habitat is not projected to vary significantly among alternatives. For both reasons, historic, current, and projected future outcomes under alternatives for this group of species were consistently projected into Outcomes 1, 2, or 3. We did note, however, that retention of juniper woodland is a key requirement of ash-throated flycatcher (Ehrlich and others 1988, Zeiner and others 1990), sage thrasher (Saab and Rich, in press), and bushtit (Butler 1981, Ehrlich and others 1988, Zeiner and others 1990). We assumed that restoration activity in Alternatives 4 and 6 would include juniper woodland in the desired mix of future vegetation types.

Third, we noted that three species associated with grassland/shrubland habitat (bobolink, grasshopper sparrow, and black rosy finch) had current and projected future weighted mean habitat outcomes lower than 4.0. The bobolink is associated with moist grassland habitats (Bollinger and Gavin 1992, Martin and Gavin 1995, Wittenberger 1978). Populations have undergone marked declines, possibly resulting from loss of habitat on their wintering grounds (Saab and Rich, in press). Habitat was judged to be disjunct and patchy, both currently and in the future under the alternatives. Restoration of native grasslands and herbs under Alternatives 4 and 6 would likely result in a broader and more contiguous distribution of favorable habitat for this species, depending on the levels of grazing that are prescribed. The grasshopper sparrow is associated with Palouse and other native bunchgrasses (Cannings 1991, Janes 1983, Marshall 1992). The distribution of this habitat is much reduced from historic levels and was judged to remain disjunct and patchy in the future under all alternatives. Restoration, if successful and if prescribed fire can be effectively used, may result in increased representation of native bunchgrasses under Alternatives 4 and 6. The black rosy finch is associated with alpine and barren, high elevation habitats (Ryser 1985, Twining 1940, Zeiner and others 1990). These habitats have a naturally patchy and disjunct distribution and as a result, the species was judged to occur in Outcome 4 under all time periods and alternatives. The major risk to alpine habitat is potential overgrazing by sheep.

Although coniferous forest habitats were generally projected to remain relatively well distributed, several species associated with coniferous forest (Hammond's flycatcher, winter wren, olive-sided flycatcher, and Wilson's warbler) had lower than average habitat outcomes. Hammond's flycatcher (Sakai 1988, Sedgwick 1994) and winter wren (Zeiner and others 1990) are associated with late-seral forest, especially that dominated by ponderosa pine. Alternatives 4 and 6 were projected to lead to increased amounts of late-seral montane forest, and thus, outcomes under these alternatives were higher than under other alternatives. Olive-sided flycatchers are associated with mature forest in juxtaposition with openings, such as those created by fire or logging (Dobkin 1993; Saab and Rich, in press). Restoration of late-seral forest conditions under Alternatives 4 and 6, and retention of late-seral forest under Alternative 7, were projected to create greater amounts and a more contiguous distribution of habitat than under other alternatives. However, differences were not great considering the uncertainty associated with mean outcome scores (table 4.15, appendix 4-D). Wilson's warblers occur in mid-seral montane forest as well as riparian shrub habitats (Dobkin 1993, Johnsgard 1986, Stewart 1973). Their habitats were judged to have been patchy and disjunct historically, currently, and under each of the alter-

natives. Livestock grazing in riparian areas creates the most likely risk to maintenance of well-distributed habitat for this species.

Cumulative effects. As shown in figure 4.25, average weighted mean outcomes for cuckoos, hummingbirds, and passerines were lower under the cumulative effects analysis than under the Federal habitat analysis. Several factors contributed to this difference in results. First, many of these species migrate to the neotropics where habitat is at risk to agriculture and other development (Saab and Rich, in press). Second, many of the species are insectivores whose prey densities may be reduced by pesticide spraying, especially on non-Federal lands (Saab and Rich, in press). In addition, some species may be directly affected by the toxic effects of herbicides and insecticides (Dobkin 1993). Expansion of cheatgrass, especially on non-Federal lands, will continue to reduce suitable habitat for species associated with native herbs and grasses. For species associated with sagebrush habitat, fire suppression has resulted in increased habitat because sagebrush is favored by suppression of fire. However, widespread conversion of sagebrush to agriculture on non-Federal lands has reduced the amount of suitable sagebrush habitat.

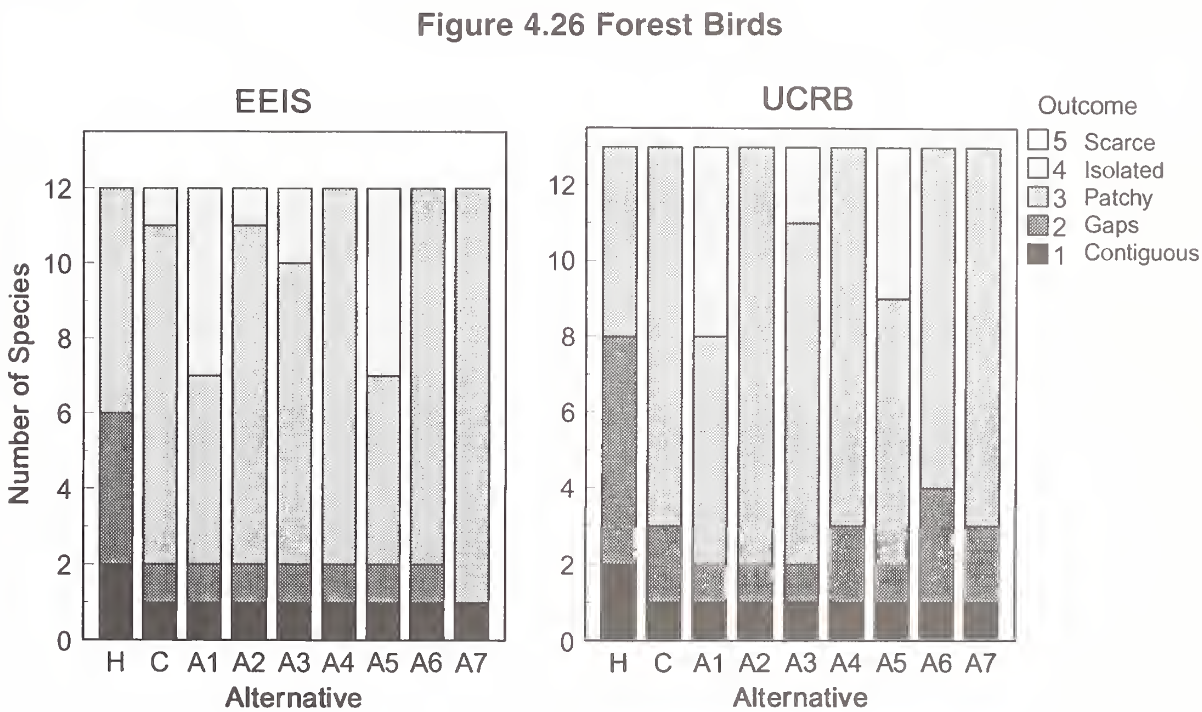

Figure 4.26. Frequency distribution of mean habitat outcome scores for 12 species of birds associated with forest habitat on Federal lands in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

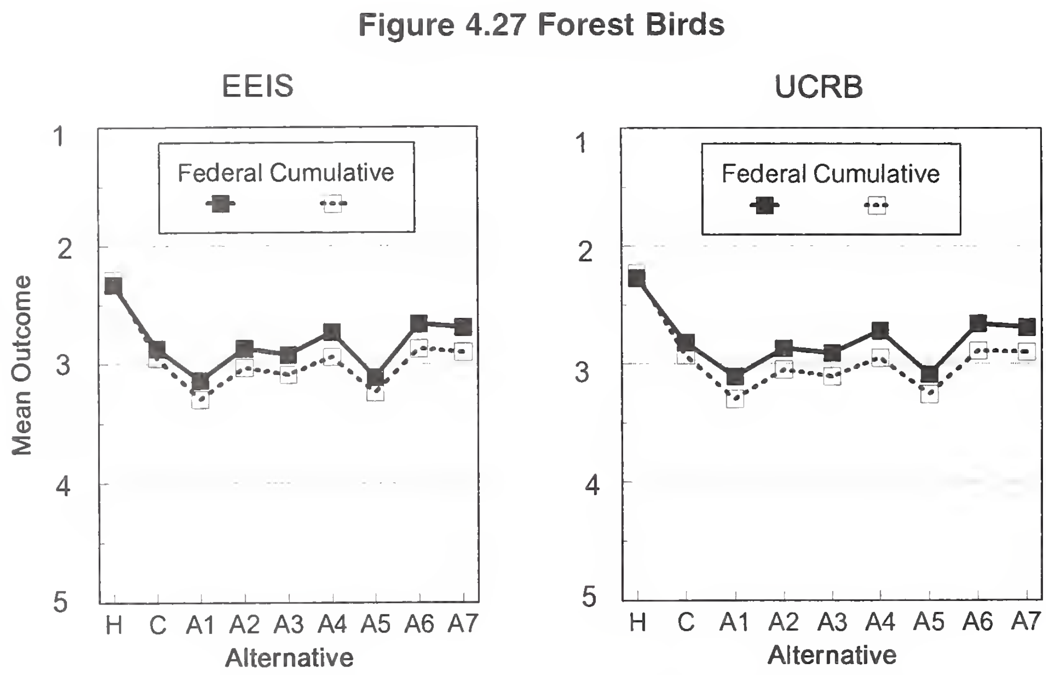

Figure 4.27. Mean outcome scores averaged over 12 species of birds associated with forest habitat in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

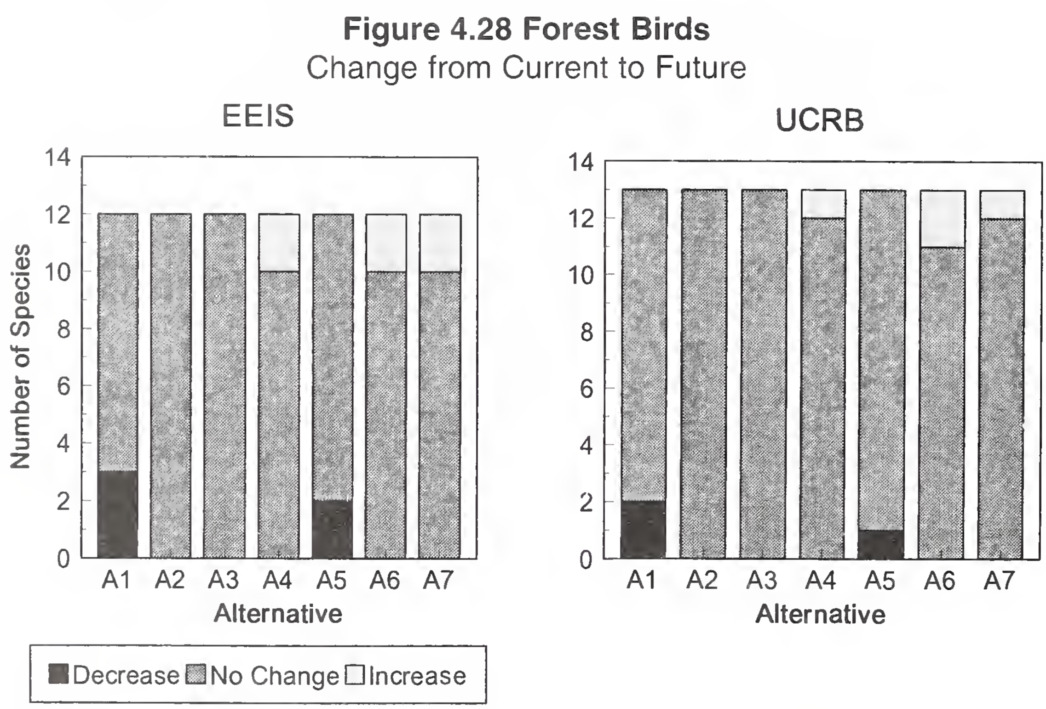

Figure 4.28. Departure of habitat outcomes on Federal lands from current conditions under each alternative for 12 species of birds associated with forest habitat in the EEIS and UCRB planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

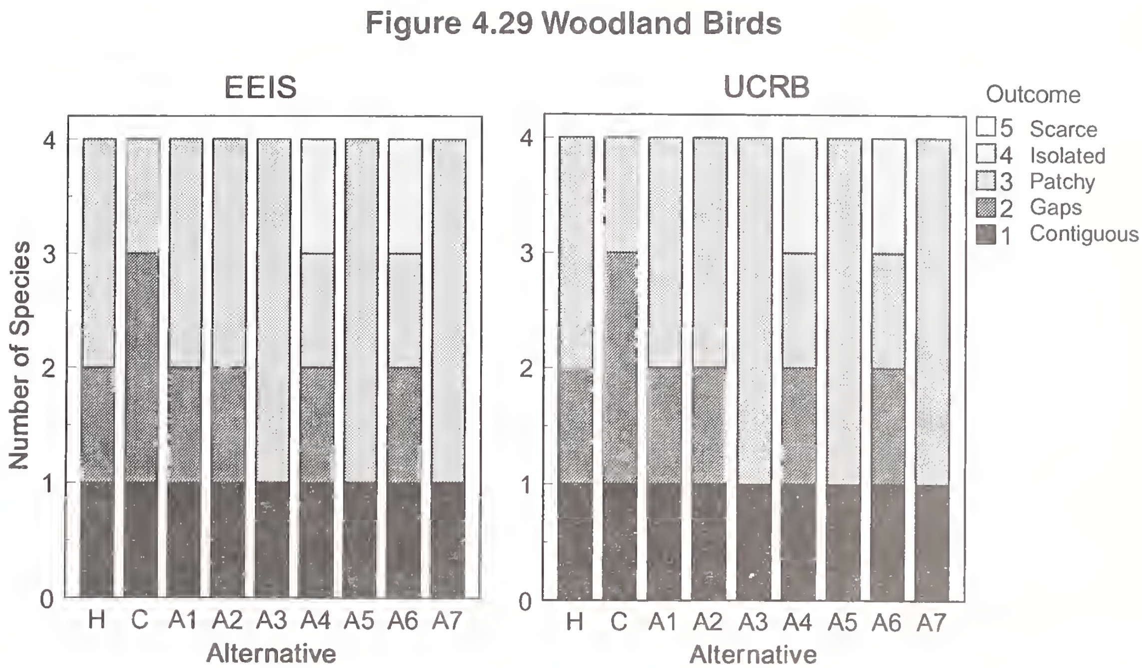

Figure 4.29. Frequency distribution of mean habitat outcome scores for four species of birds associated with woodland habitat on Federal lands in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

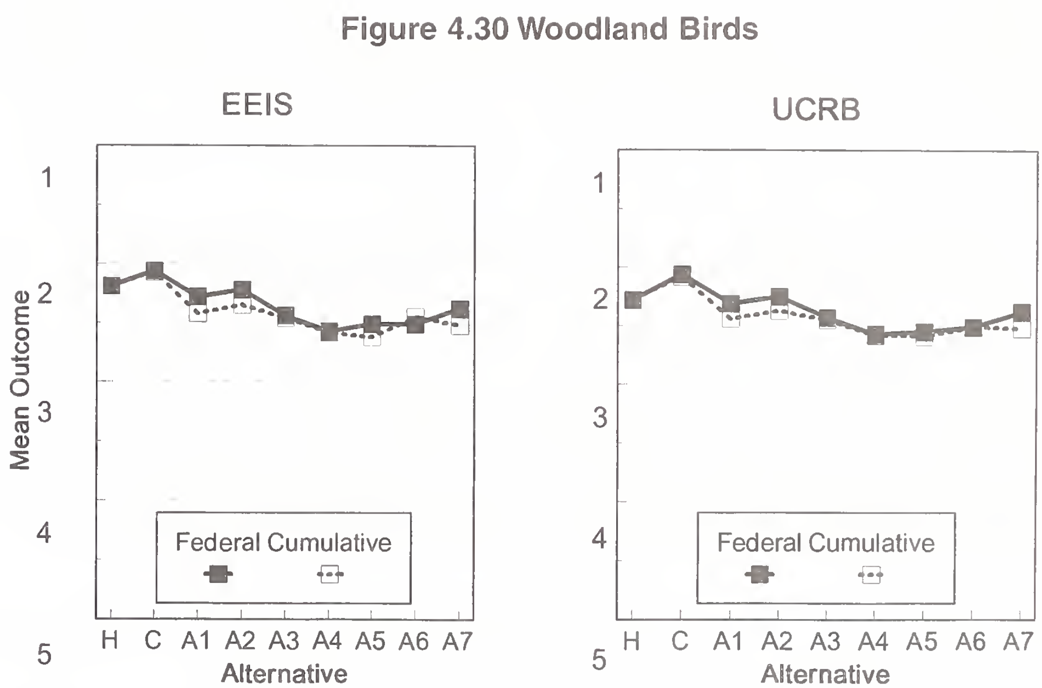

Figure 4.30. Mean outcome scores averaged over four species of birds associated with woodland habitat in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.31 Riparian Birds

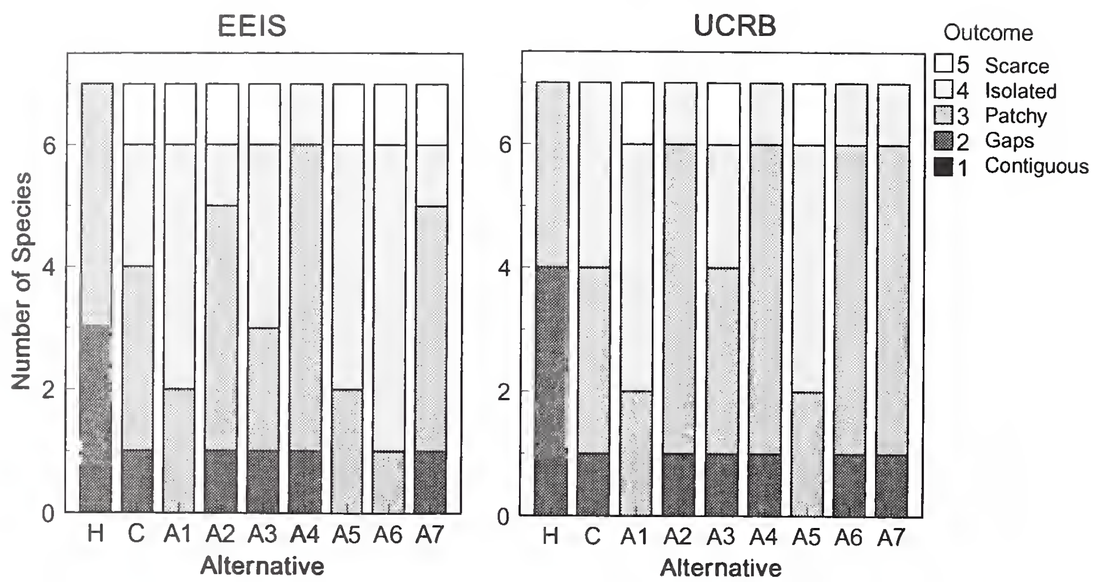

Figure 4.31. Frequency distribution of mean habitat outcome scores for seven species of birds associated with riparian habitat on Federal lands in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.32 Riparian Birds

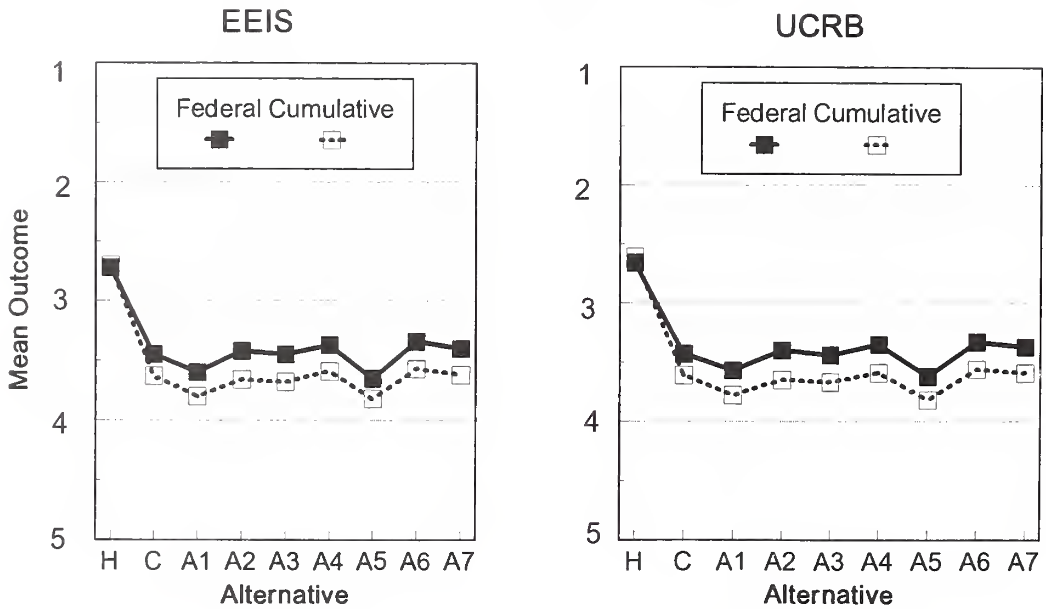

Figure 4.32. Mean outcome scores averaged over seven species of birds associated with riparian habitat in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.33 Grass/Shrub Birds

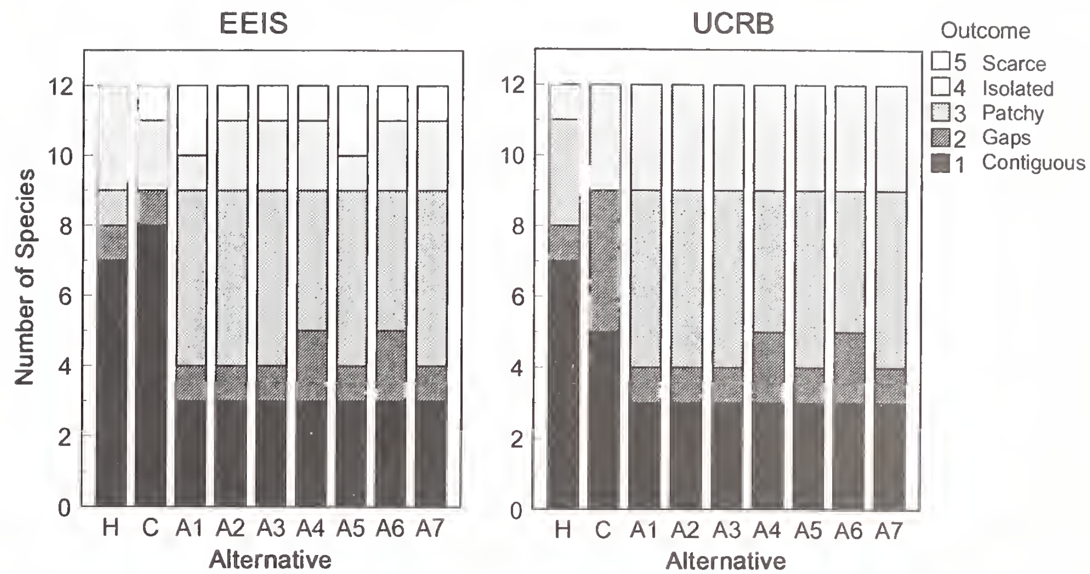

Figure 4.33. Frequency distribution of mean habitat outcome scores for 12 species of birds associated with grass/shrub habitat on Federal lands in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.34 Grass/Shrub Birds

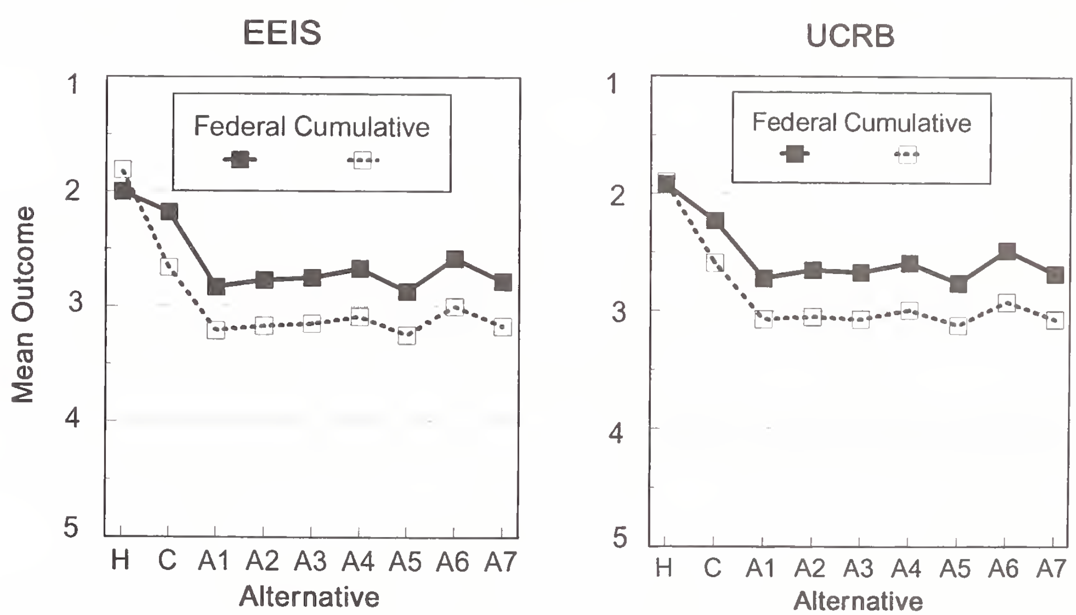

Figure 4.34. Mean outcome scores averaged over 12 species of birds associated with grass/shrub habitat in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

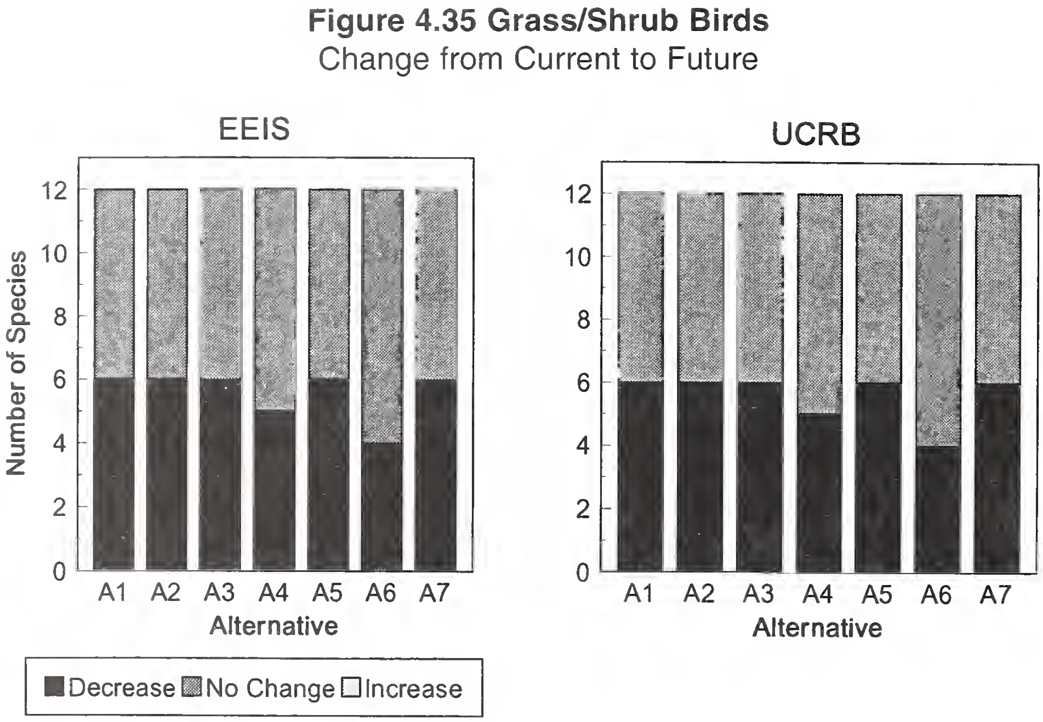

Figure 4.35. Departure of habitat outcomes on Federal lands from current conditions to each alternative for 12 species of birds associated with grass/shrub habitat in the EEIS and UCRB planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

Table 4.15. Mean likelihood scores of viability outcomes for cuckoos, hummingbirds, and passerines for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means are calculated from the individual likelihood scores of panelists.

				Period / Alternative[4]								
Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
FOR	Black-chinned hummingbird	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	23	0	0	0	0	13	0	15	13
			3	78	90	70	74	70	70	63	78	70
			4	0	10	30	26	30	18	35	8	18
			5	0	0	0	0	0	0	3	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	23	0	0	0	0	8	0	10	6
			3	78	85	53	60	53	63	48	68	65
			4	0	15	43	39	43	28	48	21	28
			5	0	0	5	1	5	3	5	1	1

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	23	0	0	0	0	13	0	15	13
			3	78	90	70	74	70	70	63	78	70
			4	0	10	30	26	30	18	35	8	18
			5	0	0	0	0	0	0	3	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	23	0	0	0	0	5	0	10	6
			3	78	85	53	60	53	63	48	68	65
			4	0	15	43	39	43	30	48	21	28
			5	0	0	5	1	5	3	5	1	1
FOR	Broad-tailed hummingbird	UCRB BLM/FS	1	3	0	0	0	0	0	0	0	0
			2	58	3	0	3	0	13	0	14	8
			3	40	70	53	54	53	68	48	69	69
			4	0	28	43	44	48	20	48	18	24
			5	0	0	5	0	0	0	5	0	0
		UCRB CumEff	1	3	0	0	0	0	0	0	0	0
			2	58	0	0	3	0	5	0	6	5
			3	40	58	45	44	43	63	40	64	61
			4	0	40	51	51	55	33	53	30	34
			5	0	3	4	3	3	0	8	0	0
FOR	Chestnut-backed chickadee	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	20	20	20	0	20	37
			3	83	75	20	80	80	57	40	63	63
			4	17	25	80	0	0	23	60	17	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	20	20	20	0	20	37
			3	83	75	20	80	80	57	40	63	63
			4	17	25	80	0	0	23	60	17	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	17	0	0	20	20	20	0	20	37
			3	83	83	20	80	80	57	40	63	63
			4	0	17	80	0	0	23	60	17	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	17	0	0	20	20	20	0	20	37
			3	83	83	20	80	80	57	40	63	63
			4	0	17	80	0	0	23	60	17	0
			5	0	0	0	0	0	0	0	0	0
FOR	Hammond's flycatcher	EEIS BLM/FS	1	35	0	0	0	0	0	0	0	0
			2	65	0	0	0	0	20	0	25	23
			3	0	58	35	58	35	70	30	70	70
			4	0	43	60	43	60	10	60	5	8
			5	0	0	5	0	5	0	10	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		EEIS CumEff	1	75	0	0	0	0	0	0	0	0
			2	25	0	0	0	0	10	0	15	13
			3	0	50	30	48	30	60	25	65	68
			4	0	50	60	48	60	30	55	20	20
			5	0	0	10	5	10	0	20	0	0
		UCRB BLM/FS	1	35	0	0	0	0	0	0	0	0
			2	65	0	0	0	0	20	0	25	23
			3	0	68	40	68	40	70	35	70	70
			4	0	33	55	33	55	10	55	5	8
			5	0	0	5	0	5	0	10	0	0
		UCRB CumEff	1	75	0	0	0	0	0	0	0	0
			2	25	0	0	0	0	10	0	15	13
			3	0	60	30	58	30	60	25	65	68
			4	0	40	60	38	60	30	55	20	20
			5	0	0	10	5	10	0	20	0	0
FOR	Lazuli bunting	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	38	24	18	25	23	37	16	36	39
			3	62	76	70	75	77	63	70	64	61
			4	0	0	12	0	0	0	14	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	38	20	14	17	15	23	12	23	23
			3	62	67	70	68	70	68	71	70	67
			4	0	13	16	15	15	9	17	7	10
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	64	44	36	40	40	52	27	52	51
			3	36	56	61	60	60	48	66	48	49
			4	0	0	3	0	0	0	7	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	64	26	16	21	17	28	14	28	28
			3	36	68	74	71	75	68	74	70	64
			4	0	6	10	8	8	4	12	2	8
			5	0	0	0	0	0	0	0	0	0
FOR	Olive-sided flycatcher	EEIS BLM/FS	1	80	0	0	0	0	0	0	0	0
			2	20	0	0	2	0	4	0	7	2
			3	0	64	51	62	55	77	42	78	77
			4	0	36	49	36	45	19	58	15	21
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	80	0	0	0	0	0	0	0	0
			2	20	0	0	0	0	0	0	0	0
			3	0	57	35	46	38	54	33	54	53
			4	0	43	63	54	61	46	61	46	47
			5	0	0	2	0	1	0	6	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		UCRB BLM/FS	1	80	0	0	0	0	0	0	0	0
			2	20	0	0	0	0	10	0	11	6
			3	0	84	61	65	67	79	56	80	82
			4	0	16	39	35	33	11	44	9	12
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	80	0	0	0	0	0	0	0	0
			2	20	0	0	0	0	0	0	0	0
			3	0	67	42	42	44	63	38	67	64
			4	0	33	58	58	56	37	60	33	36
			5	0	0	0	0	0	0	2	0	0
FOR	Rufous hummingbird	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	61	41	33	41	33	48	28	50	49
			3	39	59	50	54	49	53	49	50	51
			4	0	0	18	5	19	0	24	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	61	34	10	16	10	16	9	18	18
			3	39	59	50	55	50	65	45	64	64
			4	0	8	40	29	40	19	46	19	19
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	66	51	33	41	33	50	28	53	51
			3	34	49	48	49	54	50	49	48	49
			4	0	0	20	10	14	0	24	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	66	34	10	16	10	16	9	18	18
			3	34	59	50	55	50	65	45	64	64
			4	0	8	40	29	40	19	46	19	19
			5	0	0	0	0	0	0	0	0	0
FOR	Rufous-sided towhee	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	44	65	63	64	58	48	56	48	48
			3	56	35	37	36	42	52	44	52	52
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	44	59	60	59	56	47	58	46	46
			3	56	41	40	41	44	53	42	54	54
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	48	70	68	69	60	50	60	50	50
			3	52	30	32	31	40	50	40	50	50
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	48	63	64	63	60	49	58	48	48
			3	52	37	36	37	40	51	42	52	52
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
FOR	Western bluebird	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	88	3	10	23	35	63	35	75	45
			3	13	98	40	78	65	38	65	25	55
			4	0	0	40	0	0	0	0	0	0
			5	0	0	10	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	88	0	0	19	26	49	29	49	29
			3	13	98	40	74	71	36	69	44	51
			4	0	3	40	8	3	15	3	5	20
			5	0	0	20	0	0	0	0	3	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	88	3	10	25	38	63	38	73	43
			3	13	98	40	75	63	38	63	28	58
			4	0	0	40	0	0	0	0	0	0
			5	0	0	10	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	88	0	0	21	29	49	31	46	26
			3	13	98	40	71	69	36	66	46	54
			4	0	3	40	8	3	15	3	5	20
			5	0	0	20	0	0	0	0	3	0
FOR	Western tanager	EEIS BLM/FS	1	90	90	70	88	90	90	70	90	90
			2	10	10	30	12	10	10	30	10	10
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	88	88	46	56	58	58	44	58	58
			2	12	12	40	36	34	34	40	34	34
			3	0	0	14	8	8	8	16	8	8
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	90	90	72	88	90	90	72	90	90
			2	10	10	28	12	10	10	28	10	10
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	88	88	46	56	58	58	44	58	58
			2	12	12	40	36	34	34	40	34	34
			3	0	0	14	8	8	8	16	8	8
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
FOR	White-winged crossbill	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	15
			3	100	100	65	100	95	85	65	100	85
			4	0	0	35	0	5	15	35	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	10	10	0	10	0	15	0	18	35
			3	90	90	75	90	95	70	70	83	65
			4	0	0	25	0	5	15	30	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	15
			3	100	100	65	100	95	85	65	100	85
			4	0	0	35	0	5	15	35	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	10	10	0	10	0	15	0	18	35
			3	90	90	75	90	95	70	70	83	65
			4	0	0	25	0	5	15	30	0	0
			5	0	0	0	0	0	0	0	0	0
FOR	Wilson's warbler	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	76	48	43	47	44	58	30	63	71
			4	24	52	57	53	56	42	70	37	29
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	76	48	43	47	44	58	30	63	71
			4	24	52	57	53	56	42	70	37	29
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	80	61	45	52	49	59	33	64	74
			4	20	39	55	48	51	41	67	36	26
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	80	61	45	52	49	59	33	64	74
			4	20	39	55	48	51	41	67	36	26
			5	0	0	0	0	0	0	0	0	0
FOR	Winter wren	EEIS BLM/FS	1	5	0	0	0	0	0	0	0	0
			2	75	16	3	3	5	25	5	35	18
			3	20	68	43	48	48	55	38	53	48
			4	0	16	55	50	48	20	55	13	35
			5	0	0	0	0	0	0	3	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		EEIS CumEff	1	5	0	0	0	0	0	0	0	0
			2	75	3	0	0	0	5	0	14	0
			3	20	53	33	34	35	53	31	56	43
			4	0	45	61	61	60	43	60	30	58
			5	0	0	6	5	5	0	9	0	0
		UCRB BLM/FS	1	10	0	0	0	0	0	0	0	0
			2	83	25	10	13	13	33	13	38	25
			3	8	68	55	58	58	55	41	51	49
			4	0	8	35	30	30	13	44	11	26
			5	0	0	0	0	0	0	3	0	0
		UCRB CumEff	1	10	0	0	0	0	0	0	0	0
			2	83	5	0	0	0	10	0	13	5
			3	8	63	30	35	38	50	31	51	43
			4	0	33	64	60	58	40	60	36	53
			5	0	0	6	5	5	0	9	0	0
GS	Black rosy finch	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	100	100	67	67	96	100	67	100	100
			5	0	0	33	33	4	0	33	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	100	100	67	67	96	100	67	100	100
			5	0	0	33	33	4	0	33	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	100	100	100	100	100	100	100	100	100
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	100	100	100	100	100	100	100	100	100
			5	0	0	0	0	0	0	0	0	0
GS	Bobolink	BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	30	0	0	4	4	6	0	6	4
			4	70	62	44	62	62	74	42	76	64
			5	0	38	56	34	34	20	58	18	32
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	62	0	0	16	16	10	0	10	4
			4	38	42	28	46	44	45	26	46	44
			5	0	58	72	38	40	45	74	44	52
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	66	6	2	16	16	18	2	18	16
			4	34	62	50	56	56	64	48	66	56
			5	0	32	48	28	28	18	50	16	28

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	66	0	0	18	18	12	0	12	12
			4	34	64	46	53	53	58	44	59	53
			5	0	36	54	29	29	30	56	29	35
GS	Brewer's blackbird	EEIS BLM/FS	1	92	90	65	88	82	89	63	89	86
			2	8	10	29	12	18	11	31	11	14
			3	0	0	6	0	0	0	6	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	92	57	20	25	23	26	20	28	23
			2	8	33	54	53	53	52	54	50	53
			3	0	10	26	22	24	22	26	22	24
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	92	90	65	88	82	89	63	89	86
			2	8	10	29	12	18	11	31	11	14
			3	0	0	6	0	0	0	6	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	92	57	30	25	23	26	20	28	23
			2	8	33	54	53	53	52	54	50	53
			3	0	10	16	22	24	22	26	22	24
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
GS	Brewer's sparrow	EEIS BLM/FS	1	71	60	2	4	4	4	0	8	0
			2	29	40	26	26	26	28	25	32	25
			3	0	0	58	56	56	54	61	54	54
			4	0	0	14	14	14	14	14	6	21
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	75	12	0	0	0	0	0	0	0
			2	25	53	11	10	10	12	7	17	10
			3	0	32	57	52	52	50	54	59	48
			4	0	3	32	38	38	38	39	24	40
			5	0	0	0	0	0	0	0	0	2
		UCRB BLM/FS	1	64	22	2	4	4	4	0	10	0
			2	36	60	26	26	26	30	26	34	27
			3	0	14	56	54	54	50	58	48	52
			4	0	4	16	16	16	16	16	8	21
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	68	0	0	0	0	0	0	0	0
			2	32	47	8	9	8	12	7	17	10
			3	0	45	53	53	54	50	54	59	48
			4	0	8	39	38	38	38	39	24	40
			5	0	0	0	0	0	0	0	0	2
GS	Grasshopper sparrow	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	42	0	0	0	0	0	0	0	0
			4	58	6	6	6	4	21	4	33	8
			5	0	94	94	94	96	79	96	67	92

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	18	0	0	0	0	0	0	0	0
			2	74	0	0	0	0	0	0	0	0
			3	8	0	0	0	0	0	0	0	0
			4	0	6	6	6	4	19	4	31	8
			5	0	94	94	94	96	81	96	69	92
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	26	0	0	0	0	0	0	0	0
			3	66	6	6	6	4	16	6	28	15
			4	8	86	80	80	68	73	77	64	74
			5	0	8	14	14	28	11	17	8	11
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	40	0	0	0	0	2	0	2	0
			3	56	16	14	14	12	22	12	32	20
			4	4	82	84	84	72	74	86	66	80
			5	0	2	2	2	16	2	2	0	0
GS	Horned lark	EEIS BLM/FS	1	2	54	57	57	62	74	55	74	71
			2	42	46	43	43	38	26	45	26	29
			3	56	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	2	51	10	10	10	11	6	12	11
			2	42	49	48	48	48	49	50	48	49
			3	56	0	42	42	42	40	44	40	40
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	2	54	57	57	62	74	55	74	74
			2	42	46	43	43	38	26	45	26	26
			3	56	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	2	51	10	10	10	11	6	12	11
			2	42	49	48	48	48	49	50	48	49
			3	56	0	42	42	42	40	44	40	40
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
GS	Lark sparrow	EEIS BLM/FS	1	67	58	2	4	4	4	0	8	0
			2	33	42	26	26	26	28	25	32	25
			3	0	0	58	56	56	54	61	54	54
			4	0	0	14	14	14	14	14	6	21
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	71	2	0	0	0	0	0	0	0
			2	29	49	9	10	10	12	7	17	10
			3	0	42	59	58	58	56	60	57	56
			4	0	7	32	32	32	32	33	26	34
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	60	20	2	4	4	4	0	10	0
			2	40	62	26	26	26	30	26	34	27
			3	0	14	56	54	54	50	58	48	52
			4	0	4	16	16	16	16	16	8	21
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB CumEff	1	64	0	0	0	0	0	0	0	0
			2	36	47	8	9	8	12	7	17	10
			3	0	45	53	53	54	50	54	57	54
			4	0	8	39	38	38	38	39	26	34
			5	0	0	0	0	0	0	0	0	2
GS	Loggerhead shrike	EEIS BLM/FS	1	34	11	1	3	3	4	1	4	2
			2	66	48	26	26	26	25	24	32	25
			3	0	41	45	43	43	44	47	46	42
			4	0	0	28	28	28	27	28	18	31
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	34	8	0	0	0	0	0	0	0
			2	66	28	10	10	10	14	12	16	8
			3	0	40	40	38	36	53	30	34	28
			4	0	22	46	48	50	33	52	50	61
			5	0	2	4	4	4	0	6	0	3
		UCRB BLM/FS	1	34	11	1	3	3	3	1	4	2
			2	66	48	31	31	31	31	29	37	30
			3	0	41	43	41	41	41	45	43	38
			4	0	0	25	25	25	25	25	16	30
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	34	8	0	0	0	0	0	0	0
			2	66	28	10	10	10	14	12	16	10
			3	0	40	42	40	40	55	34	34	29
			4	0	22	46	48	48	31	50	50	58
			5	0	2	2	2	2	0	4	0	3
GS	Sage sparrow	EEIS BLM/FS	1	77	66	7	8	8	10	4	13	2
			2	23	34	41	40	40	44	39	47	42
			3	0	0	46	46	46	40	51	36	48
			4	0	0	6	6	6	6	6	4	8
			5	0	0	0	0	0	0	0	0	0
		EEIS Cum/Eff	1	81	4	0	0	0	0	0	0	0
			2	19	56	19	20	20	22	17	29	20
			3	0	34	53	52	52	50	54	59	50
			4	0	6	28	28	28	28	29	12	30
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	77	66	7	8	8	10	4	13	2
			2	23	34	41	40	40	44	39	47	42
			3	0	0	46	46	46	40	51	36	48
			4	0	0	6	6	6	6	6	4	8
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	81	2	0	0	0	0	0	0	0
			2	19	58	19	19	18	22	17	29	20
			3	0	34	53	53	54	50	54	59	50
			4	0	6	28	28	28	28	29	12	30
			5	0	0	0	0	0	0	0	0	0
GS	Sage thrasher	EEIS BLM/FS	1	71	60	2	4	4	4	0	8	0
			2	29	40	26	26	26	28	25	32	25
			3	0	0	58	56	56	54	61	54	54
			4	0	0	14	14	14	14	14	6	21
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		EEIS CumEff	1	75	2	0	0	0	0	0	4	0
			2	25	51	12	13	12	15	10	25	14
			3	0	41	55	55	55	54	56	56	53
			4	0	6	33	32	33	31	34	15	33
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	64	40	2	4	4	4	0	10	0
			2	36	44	26	26	26	30	26	34	27
			3	0	12	56	54	54	50	58	48	52
			4	0	4	16	16	16	16	16	8	21
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	68	0	0	0	0	0	0	0	0
			2	32	51	10	13	12	15	10	19	12
			3	0	43	56	55	55	54	56	58	51
			4	0	6	34	32	33	31	34	23	35
			5	0	0	0	0	0	0	0	0	2
GS	Vesper sparrow	EEIS BLM/FS	1	80	64	30	30	30	35	28	40	30
			2	20	36	54	54	54	51	52	52	54
			3	0	0	16	16	16	14	20	8	16
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	86	40	4	4	4	6	4	10	4
			2	14	49	54	54	54	57	51	62	54
			3	0	11	42	42	42	37	45	28	42
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	80	66	30	30	30	35	28	40	30
			2	20	34	54	54	54	51	52	52	54
			3	0	0	16	16	16	14	20	8	16
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	86	40	4	4	4	6	4	10	4
			2	14	48	53	53	53	55	50	58	53
			3	0	12	43	43	43	39	46	32	43
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
GS	Western meadowlark	EEIS BLM/FS	1	92	90	60	60	60	70	56	75	60
			2	8	10	40	40	40	30	44	25	40
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	92	90	41	41	41	49	37	55	43
			2	8	10	59	59	59	51	63	45	57
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	92	90	60	60	60	70	56	75	60
			2	8	10	40	40	40	30	44	25	40
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		UCRB CumEff	1	92	90	41	41	41	49	37	55	43
			2	8	10	59	59	59	51	63	45	57
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
RIP	Red-eyed vireo	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	65	38	34	49	49	51	25	54	48
			4	35	63	66	51	51	49	75	46	53
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	73	30	19	29	29	36	19	41	38
			4	28	70	81	71	71	64	81	59	63
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	65	45	38	54	54	56	29	59	53
			4	35	55	63	46	46	44	71	41	48
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	75	38	26	35	35	39	19	44	44
			4	25	63	74	65	65	61	81	56	56
			5	0	0	0	0	0	0	0	0	0
RIP	Red-winged blackbird	EEIS BLM/FS	1	2	0	0	0	0	0	0	0	0
			2	84	56	34	70	70	71	34	73	73
			3	14	44	66	30	30	29	66	27	27
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	2	0	0	0	0	0	0	0	0
			2	84	50	12	26	26	27	12	25	25
			3	14	50	67	62	62	62	67	64	64
			4	0	0	21	12	12	11	21	11	11
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	2	0	0	0	0	0	0	0	0
			2	84	56	34	70	70	71	40	67	73
			3	14	44	66	30	30	29	60	33	27
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	2	0	0	0	0	0	0	0	0
			2	84	50	12	26	26	27	12	29	29
			3	14	50	67	62	62	62	67	60	60
			4	0	0	21	12	12	11	21	11	11
			5	0	0	0	0	0	0	0	0	0
RIP	Veery	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	28	4	4	7	5	8	5	8	8
			3	72	58	49	55	51	64	45	68	58
			4	0	38	47	38	44	28	50	24	34
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	28	2	2	2	2	4	2	4	2
			3	72	40	28	44	42	55	30	53	50
			4	0	58	70	54	56	41	68	43	48
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	62	6	5	9	7	10	7	10	10
			3	38	61	53	61	56	66	50	69	64
			4	0	33	42	30	37	24	43	21	26
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	62	4	2	3	3	6	2	6	4
			3	38	41	32	42	43	47	33	53	46
			4	0	55	66	55	54	47	65	41	50
			5	0	0	0	0	0	0	0	0	0
RIP	Willow flycatcher	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	44	2	0	2	0	2	0	2	2
			3	56	56	40	51	45	54	40	58	55
			4	0	42	60	47	55	44	60	40	43
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	46	0	0	0	0	0	0	0	0
			3	54	42	27	40	34	42	29	43	38
			4	0	58	73	60	66	58	71	57	62
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	44	2	0	2	0	2	0	2	2
			3	56	56	42	51	45	54	40	58	55
			4	0	42	58	47	55	44	60	40	43
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	58	0	0	0	0	0	0	0	0
			3	42	42	27	40	32	42	29	41	42
			4	0	58	73	60	68	58	71	59	58
			5	0	0	0	0	0	0	0	0	0
RIP	Yellow warbler	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	0	0	0	0	0	0
			3	40	64	50	59	62	70	48	73	67
			4	0	36	50	41	38	30	52	27	33
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	62	0	0	0	0	0	0	0	0
			3	38	49	33	42	43	53	26	57	49
			4	0	51	67	58	57	47	74	43	51
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	0	0	0	0	0	0
			3	40	64	50	59	62	70	48	72	67
			4	0	36	50	41	38	30	52	28	33
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	62	0	0	0	0	0	0	0	0
			3	38	49	33	42	43	53	26	57	49
			4	0	51	67	58	57	47	74	43	51
			5	0	0	0	0	0	0	0	0	0
RIP	Yellow-billed cuckoo	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	55	0	0	0	0	0	0	0	0
			4	45	50	28	48	48	53	5	54	45
			5	0	50	73	53	53	48	95	46	55
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	56	0	0	0	0	0	0	0	0
			4	44	10	10	25	25	28	0	30	26
			5	0	90	90	75	75	73	100	70	74
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	66	0	0	0	0	0	0	0	0
			4	34	54	28	48	48	53	5	54	45
			5	0	46	73	53	53	48	95	46	55
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	69	0	0	0	0	0	0	0	0
			4	31	13	11	26	26	29	0	31	28
			5	0	88	89	74	74	71	100	69	73
RIP	Yellow-breasted chat	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	55	0	0	0	0	0	0	0	0
			3	45	49	41	54	48	61	39	65	54
			4	0	51	59	46	53	39	61	35	46
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	0	0	0	0	0	0
			3	40	36	30	41	34	50	28	53	50
			4	0	64	70	59	66	50	73	48	50
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	55	0	0	0	0	0	0	0	0
			3	45	49	44	56	46	63	40	66	61
			4	0	51	56	44	54	38	60	34	39
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	0	0	0	0	0	0
			3	40	36	30	41	34	50	28	53	50
			4	0	64	70	59	66	50	73	48	50
			5	0	0	0	0	0	0	0	0	0
WD	Ash-throated flycatcher	EEIS BLM/FS	1	15	24	10	0	0	0	0	0	5
			2	63	65	58	58	13	13	10	29	48
			3	23	11	30	30	51	51	46	40	35
			4	0	0	3	3	31	31	39	31	13
			5	0	0	0	0	5	5	5	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		EEIS CumEff	1	15	24	5	5	0	0	0	5	0
			2	63	65	53	53	20	23	13	46	39
			3	23	11	35	35	54	54	50	41	43
			4	0	0	8	8	26	24	38	8	19
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	15	24	10	10	0	0	0	0	5
			2	61	64	56	56	13	13	10	29	46
			3	24	13	31	31	50	50	45	39	36
			4	0	0	3	3	33	33	40	33	13
			5	0	0	0	0	5	5	5	0	0
		UCRB CumEff	1	15	24	5	5	0	0	0	3	0
			2	61	64	53	53	20	23	13	41	39
			3	24	13	35	35	54	54	50	39	43
			4	0	0	8	8	26	24	38	13	19
			5	0	0	0	0	0	0	0	5	0
WD	Bushtit	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	25	20	20	25	0	30	0	0
			3	100	65	55	55	60	50	60	50	60
			4	0	10	25	25	15	50	10	50	40
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	25	20	20	25	0	30	0	0
			3	100	65	55	55	60	50	60	50	60
			4	0	10	25	25	15	50	10	50	40
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	25	15	15	25	0	25	0	0
			3	65	65	55	55	65	50	55	50	60
			4	35	10	30	30	10	50	20	50	40
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	25	15	15	25	0	25	0	0
			3	65	65	55	55	65	50	55	50	60
			4	35	10	30	30	10	50	20	50	40
			5	0	0	0	0	0	0	0	0	0
WD	Chipping sparrow	EEIS BLM/FS	1	95	93	93	93	93	95	93	95	95
			2	5	8	8	8	8	5	8	5	5
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	95	86	60	61	61	64	60	66	64
			2	5	14	40	39	39	36	40	34	36
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	95	93	93	93	93	95	93	95	95
			2	5	8	8	8	8	5	8	5	5
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		UCRB CumEff	1	95	86	60	61	61	64	60	66	64
			2	5	14	40	39	39	36	40	34	36
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
WD	Green-tailed towhee	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	35	58	26	50	50	56	26	55	49
			3	65	43	71	50	50	44	71	45	51
			4	0	0	3	0	0	0	3	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	35	58	26	50	50	56	26	55	49
			3	65	43	71	50	50	44	71	45	51
			4	0	0	3	0	0	0	3	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	35	58	26	50	50	56	26	55	49
			3	65	43	71	50	50	44	71	45	51
			4	0	0	3	0	0	0	3	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	35	58	26	50	50	56	26	55	49
			3	65	43	71	50	50	44	71	45	51
			4	0	0	3	0	0	0	3	0	0
			5	0	0	0	0	0	0	0	0	0

[1]Group: FOR - forest birds; GS - grassland/shrub birds; RIP - riparian birds; WD - woodland birds.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[4]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

Table 4.16. Mean viability outcomes for habitat and populations of cuckoos, hummingbirds, and passerines for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

Group[1]	Species Name	Area[2]	H	C	A1	A2	A3	A4	A5	A6	A7
			Period / Alternative[3]								
FOR	Black-chinned hummingbird	EEIS BLM/FS	2.8	3.1	3.3	3.3	3.3	3.1	3.4	3.0	3.1
		EEIS CumEff	2.8	3.2	3.6	3.4	3.6	3.3	3.6	3.1	3.2
		UCRB BLM/FS	2.8	3.1	3.3	3.3	3.3	3.1	3.4	3.0	3.1
		UCRB CumEff	2.8	3.2	3.6	3.4	3.6	3.3	3.6	3.1	3.2

Table 4.16 (continued)

Group[1]	Species Name	Area[2]	H	C	A1	A2	A3	A4	A5	A6	A7
			Period / Alternative[3]								
FOR	Broad-tailed hummingbird	UCRB BLM/FS	2.4	3.3	3.6	3.4	3.5	3.1	3.6	3.1	3.2
		UCRB CumEff	2.4	3.5	3.6	3.6	3.6	3.3	3.7	3.2	3.3
FOR	Chestnut-backed chickadee	EEIS BLM/FS	3.2	3.3	3.8	2.8	2.8	3.0	3.6	3.0	2.6
		EEIS CumEff	3.2	3.3	3.8	2.8	2.8	3.0	3.6	3.0	2.6
		UCRB BLM/FS	2.8	3.2	3.8	2.8	2.8	3.0	3.6	3.0	2.6
		UCRB CumEff	2.8	3.2	3.8	2.8	2.8	3.0	3.6	3.0	2.6
FOR	Hammond's flycatcher	EEIS BLM/FS	1.7	3.5	3.7	3.5	3.7	2.9[4]	3.8	2.8[4]	2.9[4]
		EEIS CumEff	1.3	3.5	3.8	3.6	3.8	3.2	4.0	3.1	3.1
		UCRB BLM/FS	1.7	3.4	3.7	3.4	3.7	2.9	3.8	2.8[4]	2.9
		UCRB CumEff	1.3	3.4	3.8	3.5	3.8	3.2	4.0[4]	3.1	3.1
FOR	Lazuli bunting	EEIS BLM/FS	2.6	2.8	2.9	2.8	2.8	2.6	3.0	2.6	2.6
		EEIS CumEff	2.6	2.9	3.0	3.0	3.0	2.9	3.1	2.8	2.9
		UCRB BLM/FS	2.4	2.6	2.7	2.6	2.6	2.5	2.8	2.5	2.5
		UCRB CumEff	2.4	2.8	2.9	2.9	2.9	2.8	3.0	2.7	2.8
FOR	Olive-sided flycatcher	EEIS BLM/FS	1.2	3.4	3.5	3.3	3.5	3.2	3.6	3.1	3.2
		EEIS CumEff	1.2	3.4	3.7	3.5	3.6	3.5	3.7	3.5	3.5
		UCRB BLM/FS	1.2	3.2	3.4	3.4	3.3	3.0	3.4	3.0	3.1
		UCRB CumEff	1.2	3.3	3.6	3.6	3.6	3.4	3.6	3.3	3.4
FOR	Rufous hummingbird	EEIS BLM/FS	2.4	2.6	2.9	2.6	2.9	2.6	3.0	2.5	2.5
		EEIS CumEff	2.4	2.8	3.3[4]	3.1	3.3[4]	3.0	3.4[4]	3.0	3.0
		UCRB BLM/FS	2.3	2.5	2.9	2.7	2.8	2.5	3.0[4]	2.5	2.5
		UCRB CumEff	2.3	2.8	3.3[4]	3.1	3.3[4]	3.0	3.4[4]	3.0	3.0
FOR	Rufous-sided towhee	EEIS BLM/FS	2.6	2.4	2.4	2.4	2.4	2.5	2.4	2.5	2.5
		EEIS CumEff	2.6	2.4	2.4	2.4	2.4	2.5	2.4	2.5	2.5
		UCRB BLM/FS	2.5	2.3	2.3	2.3	2.4	2.5	2.4	2.5	2.5
		UCRB CumEff	2.5	2.4	2.4	2.4	2.4	2.5	2.4	2.5	2.5
FOR	Western bluebird	EEIS BLM/FS	2.2	3.0	3.5[4]	2.8	2.7	2.4[4]	2.7	2.3[4]	2.6
		EEIS CumEff	2.2	3.1	3.8[4]	2.9	2.8	2.7	2.8	2.7	2.9
		UCRB BLM/FS	2.2	3.0	3.5[4]	2.8	2.7	2.4[4]	2.7	2.3[4]	2.6
		UCRB CumEff	2.2	3.1	3.8[4]	2.9	2.8	2.7	2.7	2.7	2.9
FOR	Western tanager	EEIS BLM/FS	1.1	1.1	1.3	1.1	1.1	1.1	1.3	1.1	1.1
		EEIS CumEff	1.1	1.1	1.7[4]	1.5	1.5	1.5	1.7[4]	1.5	1.5
		UCRB BLM/FS	1.1	1.1	1.3	1.1	1.1	1.1	1.3	1.1	1.1
		UCRB CumEff	1.1	1.1	1.7[4]	1.5	1.5	1.5	1.7[4]	1.5	1.5
FOR	White-winged crossbill	EEIS BLM/FS	3.0	3.0	3.4	3.0	3.1	3.2	3.4	3.0	2.9
		EEIS CumEff	2.9	2.9	3.3	2.9	3.1	3.0	3.3	2.9	2.7
		UCRB BLM/FS	3.0	3.0	3.4	3.0	3.1	3.2	3.4	3.0	2.9
		UCRB CumEff	2.9	2.9	3.3	2.9	3.1	3.0	3.3	2.9	2.7
FOR	Wilson's warbler	EEIS BLM/FS	3.2	3.5	3.6	3.5	3.6	3.4	3.7	3.4	3.3
		EEIS CumEff	3.2	3.5	3.6	3.5	3.6	3.4	3.7	3.4	3.3
		UCRB BLM/FS	3.2	3.4	3.6	3.5	3.5	3.4	3.7	3.4	3.3
		UCRB CumEff	3.2	3.4	3.6	3.5	3.5	3.4	3.7	3.4	3.3
FOR	Winter wren	EEIS BLM/FS	2.2	3.0	3.6[4]	3.5[4]	3.5	3.0	3.6[4]	2.8	3.2
		EEIS CumEff	2.2	3.5	3.7	3.7	3.7	3.4	3.8	3.2	3.6
		UCRB BLM/FS	2.0	2.9	3.3	3.2	3.2	2.8	3.4[4]	2.7	3.0
		UCRB CumEff	2.0	3.3	3.8	3.7	3.7	3.3	3.8	3.2	3.5

Table 4.16 (continued)

Group[1]	Species Name	Area[2]	H	C	A1	A2	A3	A4	A5	A6	A7
			Period / Alternative[3]								
GS	Black rosy finch	EEIS BLM/FS	4.0	4.0	4.3	4.3	4.0	4.0	4.3	4.0	4.0
		EEIS CumEff	4.0	4.0	4.3	4.3	4.0	4.0	4.3	4.0	4.0
		UCRB BLM/FS	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
		UCRB CumEff	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
GS	Bobolink	EEIS BLM/FS	3.7	4.4	4.6	4.3	4.3	4.1	4.6	4.1	4.3
		EEIS CumEff	3.4	4.6	4.7	4.2	4.2	4.4	4.7	4.3	4.5
		UCRB BLM/FS	3.3	4.3	4.5	4.1	4.1	4.0	4.5	4.0	4.1
		UCRB CumEff	3.3	4.4	4.5	4.1	4.1	4.2	4.6	4.2	4.2
GS	Brewer's blackbird	EEIS BLM/FS	1.1	1.1	1.4	1.1	1.2	1.1	1.4	1.1	1.1
		EEIS CumEff	1.1	1.5	2.1[4]	2.0	2.0	2.0	2.1[4]	1.9	2.0
		UCRB BLM/FS	1.1	1.1	1.4	1.1	1.2	1.1	1.4	1.1	1.1
		UCRB CumEff	1.1	1.5	1.9	2.0	2.0	2.0	2.1[4]	1.9	2.0
GS	Brewer's sparrow	EEIS BLM/FS	1.3	1.4	2.8[4]	2.8[4]	2.8[4]	2.8[4]	2.9[4]	2.6[4]	3.0[4]
		EEIS CumEff	1.3	2.3	3.2[4]	3.3[4]	3.3[4]	3.3[4]	3.3[4]	3.1[4]	3.3[4]
		UCRB BLM/FS	1.4	2.0	2.9[4]	2.8[4]	2.8[4]	2.8[4]	2.9[4]	2.5[4]	2.9[4]
		UCRB CumEff	1.3	2.6	3.3[4]	3.3[4]	3.3[4]	3.3[4]	3.3[4]	3.1	3.3[4]
GS	Grasshopper sparrow	EEIS BLM/FS	3.6	4.9	4.9	4.9	5.0	4.8	5.0	4.7	4.9
		EEIS CumEff	1.9	4.9	4.9	4.9	5.0	4.8	5.0	4.7	4.9
		UCRB BLM/FS	2.8	4.0	4.1	4.1	4.2	4.0	4.1	3.8	4.0
		UCRB CumEff	2.6	3.9	3.9	3.9	4.0	3.8	3.9	3.6	3.8
GS	Horned lark	EEIS BLM/FS	2.5	1.5	1.4	1.4	1.4	1.3	1.5	1.3	1.3
		EEIS CumEff	2.5	1.5	2.3[4]	2.3[4]	2.3[4]	2.3[4]	2.4[4]	2.3[4]	2.3[4]
		UCRB BLM/FS	2.5	1.5	1.4	1.4	1.4	1.3	1.5	1.3	1.3
		UCRB CumEff	2.5	1.5	2.3[4]	2.3[4]	2.3[4]	2.3[4]	2.4[4]	2.3[4]	2.3[4]
GS	Lark sparrow	EEIS BLM/FS	1.3	1.4	2.8[4]	2.8[4]	2.8[4]	2.8[4]	2.9[4]	2.6[4]	3.0[4]
		EEIS CumEff	1.3	2.5	3.2[4]	3.2[4]	3.2[4]	3.2[4]	3.3[4]	3.1[4]	3.2[4]
		UCRB BLM/FS	1.4	2.0	2.9[4]	2.8[4]	2.8[4]	2.8[4]	2.9[4]	2.5[4]	2.9[4]
		UCRB CumEff	1.4	2.6	3.3[4]	3.3[4]	3.3[4]	3.3[4]	3.3[4]	3.1	3.3[4]
GS	Loggerhead shrike	EEIS BLM/FS	1.7	2.3	3.0[4]	3.0[4]	3.0[4]	2.9[4]	3.0[4]	2.8	3.0[4]
		EEIS CumEff	1.7	2.8	3.4[4]	3.5[4]	3.5[4]	3.2	3.5[4]	3.3[4]	3.6[4]
		UCRB BLM/FS	1.7	2.3	2.9[4]	2.9[4]	2.9[4]	2.9[4]	2.7	2.9[4]	3.0[4]
		UCRB CumEff	1.7	2.8	3.4[4]	3.4[4]	3.4[4]	3.2	3.5[4]	3.3[4]	3.5[4]
GS	Sage sparrow	EEIS BLM/FS	1.2	1.3	2.5[4]	2.5[4]	2.5[4]	2.4[4]	2.6[4]	2.3[4]	2.6[4]
		EEIS Cum/Eff	1.2	2.4	3.1[4]	3.1[4]	3.1[4]	3.1[4]	3.1[4]	2.8	3.1[4]
		UCRB BLM/FS	1.2	1.3	2.5[4]	2.5[4]	2.5[4]	2.4[4]	2.6[4]	2.3[4]	2.6[4]
		UCRB CumEff	1.2	2.4	3.1[4]	3.1[4]	3.1[4]	3.1[4]	3.1[4]	2.8	3.1[4]
GS	Sage thrasher	EEIS BLM/FS	1.3	1.4	2.8[4]	2.8[4]	2.8[4]	2.8[4]	2.9[4]	2.6[4]	3.0[4]
		EEIS CumEff	1.3	2.5	3.2[4]	3.2[4]	3.2[4]	3.2[4]	3.2[4]	2.8	3.2[4]
		UCRB BLM/FS	1.4	1.8	2.9[4]	2.8[4]	2.8[4]	2.8[4]	2.9[4]	2.5[4]	2.9[4]
		UCRB CumEff	1.3	2.6	3.2[4]	3.2[4]	3.2[4]	3.2[4]	3.2[4]	3.0	3.3[4]
GS	Vesper sparrow	EEIS BLM/FS	1.2	1.4	1.9[4]	1.9[4]	1.9[4]	1.8	1.9[4]	1.7	1.9[4]
		EEIS CumEff	1.1	1.7	2.4[4]	2.4[4]	2.4[4]	2.3[4]	2.4[4]	2.2	2.4[4]
		UCRB BLM/FS	1.2	1.3	1.9[4]	1.9[4]	1.9[4]	1.8	1.9[4]	1.7	1.9[4]
		UCRB CumEff	1.1	1.7	2.4[4]	2.4[4]	2.4[4]	2.3[4]	2.4[4]	2.4[4]	2.4[4]
GS	Western meadowlark	EEIS BLM/FS	1.1	1.1	1.4	1.4	1.4	1.3	1.4	1.3	1.4
		EEIS CumEff	1.1	1.1	1.6	1.6	1.6	1.5	1.6[4]	1.5	1.6
		UCRB BLM/FS	1.1	1.1	1.4	1.4	1.4	1.3	1.4	1.3	1.4
		UCRB CumEff	1.1	1.1	1.6	1.6	1.6	1.5	1.6[4]	1.5	1.6

Table 4.16 (continued)

Group[1]	Species Name	Area[2]	Period / Alternative[3]								
			H	C	A1	A2	A3	A4	A5	A6	A7
RIP	Red-eyed vireo	EEIS BLM/FS	3.4	3.7	3.7	3.5	3.5	3.5	3.8	3.5	3.6
		EEIS CumEff	3.3	3.7	3.8	3.7	3.7	3.6	3.8	3.6	3.7
		UCRB BLM/FS	3.4	3.6	3.7	3.5	3.5	3.4	3.7	3.4	3.5
		UCRB CumEff	3.3	3.7	3.7	3.7	3.7	3.6	3.8	3.6	3.6
RIP	Red-winged blackbird	EEIS BLM/FS	2.1	2.4	2.7	2.3	2.3	2.3	2.7	2.3	2.3
		EEIS CumEff	2.1	2.5	3.1[4]	2.9	2.9	2.8	3.1[4]	2.9	2.9
		UCRB BLM/FS	2.1	2.4	2.7	2.3	2.3	2.3	2.6	2.3	2.3
		UCRB CumEff	2.1	2.5	3.1[4]	2.9	2.9	2.8	3.1[4]	2.8	2.8
RIP	Veery	EEIS BLM/FS	2.7	3.3	3.4	3.3	3.4	3.2	3.5	3.2	3.3
		EEIS CumEff	2.7	3.6	3.7	3.5	3.5	3.4	3.7	3.4	3.5
		UCRB BLM/FS	2.4	3.3	3.4	3.2	3.3	3.1	3.4	3.1	3.2
		UCRB CumEff	2.4	3.5	3.6	3.5	3.5	3.4	3.6	3.4	3.5
RIP	Willow flycatcher	EEIS BLM/FS	2.6	3.4	3.6	3.5	3.6	3.4	3.6	3.4	3.4
		EEIS CumEff	2.5	3.6	3.7	3.6	3.7	3.6	3.7	3.6	3.6
		UCRB BLM/FS	2.6	3.4	3.6	3.5	3.6	3.4	3.6	3.4	3.4
		UCRB CumEff	2.4	3.6	3.7	3.6	3.7	3.6	3.7	3.6	3.6
RIP	Yellow warbler	EEIS BLM/FS	2.4	3.4	3.5	3.4	3.4	3.3	3.5	3.3	3.3
		EEIS CumEff	2.4	3.5	3.7	3.6	3.6	3.5	3.7	3.4	3.5
		UCRB BLM/FS	2.4	3.4	3.5	3.4	3.4	3.3	3.5	3.3	3.3
		UCRB CumEff	2.4	3.5	3.7	3.6	3.6	3.5	3.7	3.4	3.5
RIP	Yellow-billed cuckoo	EEIS BLM/FS	3.5	4.5	4.8	4.6	4.6	4.5	5.0	4.5	4.6
		EEIS CumEff	3.4	4.9	4.9	4.8	4.8	4.8	5.0	4.7	4.7
		UCRB BLM/FS	3.3	4.5	4.8	4.6	4.6	4.5	5.0	4.5	4.6
		UCRB CumEff	3.3	4.9	4.9	4.7	4.7	4.7	5.0	4.7	4.8
RIP	Yellow-breasted chat	EEIS BLM/FS	2.5	3.5	3.6	3.5	3.6	3.4	3.6	3.4	3.5
		EEIS CumEff	2.4	3.6	3.7	3.6	3.7	3.5	3.8	3.5	3.5
		UCRB BLM/FS	2.5	3.5	3.6	3.4	3.5	3.4	3.6	3.3	3.4
		UCRB CumEff	2.4	3.6	3.7	3.6	3.7	3.5	3.8	3.5	3.5
WD	Ash-throated flycatcher	EEIS BLM/FS	2.1	1.9	2.3	2.3	3.3[4]	3.3[4]	3.4[4]	3.0[4]	2.6[4]
		EEIS CumEff	2.1	1.9	2.5[4]	2.5[4]	3.1[4]	3.0[4]	3.3[4]	2.5[4]	2.8[4]
		UCRB BLM/FS	2.1	1.9	2.3	2.3	3.3[4]	3.3[4]	3.4[4]	3.0[4]	2.6[4]
		UCRB CumEff	2.1	1.9	2.5[4]	2.5[4]	3.1[4]	3.0[4]	3.3[4]	2.8[4]	2.8[4]
WD	Bushtit	EEIS BLM/FS	3.0	2.9	3.1	3.1	2.9	3.5[4]	2.8	3.5[4]	3.4[4]
		EEIS CumEff	3.0	2.9	3.1	3.1	2.9	3.5[4]	2.8	3.5[4]	3.4[4]
		UCRB BLM/FS	3.4	2.9	3.2	3.2	2.9	3.5[4]	3.0	3.5[4]	3.4[4]
		UCRB CumEff	3.4	2.9	3.2	3.2	2.9	3.5[4]	3.0	3.5[4]	3.4[4]
WD	Chipping sparrow	EEIS BLM/FS	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		EEIS CumEff	1.1	1.1	1.4	1.4	1.4	1.4	1.4	1.3	1.4
		UCRB BLM/FS	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		UCRB CumEff	1.1	1.1	1.4	1.4	1.4	1.4	1.4	1.3	1.4
WD	Green-tailed towhee	EEIS BLM/FS	2.7	2.5	2.8	2.5	2.5	2.4	2.8	2.5	2.5
		EEIS CumEff	2.7	2.5	2.8	2.5	2.5	2.4	2.8	2.5	2.5
		UCRB BLM/FS	2.7	2.5	2.8	2.5	2.5	2.4	2.8	2.5	2.5
		UCRB CumEff	2.7	2.5	2.8	2.5	2.5	2.4	2.8	2.5	2.5

[1]Group: FOR - forest birds; GS - grassland/shrub birds; RIP - riparian birds; WD - woodland birds.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[4]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table may be misleading.

Mammals

Bats

<u>Introduction</u>—The panel considered the fringed myotis, hoary bat, long-eared myotis, long-legged myotis, pale western big-eared bat, silver-haired bat, spotted bat, western pipistrelle, western small-footed myotis and the Yuma myotis when evaluating the effects of the preliminary draft EIS alternatives. The process used to select species for evaluation under the alternatives is outlined in the section "Methods for Assessing Effect on Terrestrial Species." All of the bats except hoary, silver-haired, and western pipistrelle were initially included because they were Federal C2 Candidate species for federal listing as endangered or threatened. The other three species were evaluated because of past population declines, and/or because their habitat has declined from historic levels or would potentially decline under one or more of the alternatives.

<u>Methods</u>—During the panel discussions, the western pipistrelle was dropped from further consideration because we judged that alternatives would not strongly influence its habitat. The Yuma myotis was not rated by panelists because analysis at a finer scale was determined to be more appropriate for this species.

The bat panel developed a summary of characteristics of the alternatives key to evaluating the effects on bats. The most important parameters for evaluating bat habitat under the alternatives were: acres of late-seral lower montane and montane forest habitat maintained through time; snag and down wood standards; riparian management standards; projected road density; and cliff, mine, and cave management standards.

<u>Results</u>—After reviewing results of the expert panel, the Science Team adjusted the bat species outcomes for the BLM and Forest Service habitat evaluation. These adjustments reflected additional information on Alternatives 2 and 7 that had been obtained after panel deliberations were completed; the information included corrections of late-seral habitat projections, and clarification of riparian standards. An underestimation of large snag retention under the alternatives at year 100 and the tendency of panelists to reflect population, rather than habitat effects in the BLM and Forest Service habitat evaluation, were also addressed. Results are shown in table 4.17, which displays mean outcomes, and table 4.18, which displays the weighted mean outcomes. The weighted means for each alternative are shown in figure 4.36. The number of species whose weighted mean fell into each outcome class under each alternative is shown in figure 4.37. The numbers of species whose weighted mean outcome changed by more than one-half of an outcome class between current and the projected future under each alternative are shown in figure 4.38.

<u>Discussion</u>—Habitat outside of BLM- and FS-administered lands has been significantly altered by conversion to agricultural and urban uses. Habitat on BLM- and Forest Service-administered lands, although reduced in acreage from historic conditions, has been impacted less than the habitat on non-Federal lands and plays an important role in providing habitat for these bats. Restoration of historic habitat conditions across the Federal landscape would make a significant contribution to re-establishment or retention of bat populations throughout the Basin.

Projected outcomes for habitat on BLM- and Forest Service-administered lands were similar for all the bat species and indicate that current habitat on these lands has declined from historic conditions (fig. 4.36). Habitat conditions for most bat species have declined significantly on BLM- and FS-administered lands from historic to current conditions (table 4.18). The exception is the spotted bat whose habitat was patchy and isolated even under historic conditions and is not projected to have declined significantly on Federal lands from historic to current conditions (table 4.18). The historic declines for most species result from increased human disturbance of roosts, reduced large snag densities, decreased acreage and distribution of late-seral lower montane and montane forest, and reduced acreage and quality of riparian areas.

Habitat for three species (fringed myotis, hoary bat, and western small-footed myotis) was projected to continue declining significantly under Alternative 5, and habitat for these three species plus the silver-haired bat is projected to decline under Alternative 1 (table 4.18). Under Alternatives 2, 3, and 7, habitat outcomes for BLM- and Forest Service-administered lands were projected to remain similar to current habitat conditions for most species (fig. 4.38). Habitat quality, quantity, and distribution were projected to increase from current conditions for one species under Alternatives 4 and 6 (fig. 4.38). Alternatives 4 and 6 generally increase late-seral forest and snags, improve riparian conditions, and reduce the likelihood of human disturbance.

Projections of cumulative effects for bat populations followed a pattern similar to the outcomes for Federal lands, but outcomes were generally poorer when cumulative effects were considered. Historic bat populations throughout the entire Basin landscape were projected as Outcome 2 or 3 for most of these bats (the spotted bat is described as being in Outcome 4 historically). Change in habitat across all ownerships and other cumulative effects have led to increased patchiness and isolation of populations. In addition to the factors associated with the Federal habitat declines on Federal lands, overall population declines have been attributed to effects of pesticides, unregulated killing, changes in habitat on non-Federal lands, water quality issues not related to habitat management on Federal lands, air quality issues, and effects from outside the Basin.

Fringed myotis. The range of fringed myotis encompasses most of the EEIS area, except parts of northeastern Washington and southeastern Oregon, and part of the Upper Clark Fork region in Montana. Members of the genus *Myotis* are most often detected in mature stands but may also be observed in younger, managed stands (Erickson and West, in press). In New Mexico, colonial roosts containing 30 to more than 200 fringed myotis bats were found in individual ponderosa pine snags, or in live ponderosa pine with long, vertical cracks. These snag and live tree roosts were located in stringers of ponderosa pine within pure pinyon/juniper habitats or at the interface of these two habitats (Chung-MacCoubrey, in press). Fringed myotis have also been found in mines (Perkins and others 1990). Fringed myotis are considered to be between-, within-, and below-canopy foragers (Black 1974).

Fringed myotis are considered to be very sensitive to human disturbance. Therefore, road density was an important factor in evaluating alternatives. Cave and mine protection was not specified in the alternatives and initial panelist judgments reflected this through lower outcomes. Later adjustments to outcomes were based, in part, on further specifying standards for cliff, cave, and mine management to ensure protection of these species. Current habitat outcomes on BLM- and Forest Service-administered lands for fringed myotis are projected to have declined one outcome from historic conditions. Outcome under Alternative 1 would continue to decline 0.5 outcome units over a 100-year period (to slightly less than Outcome 4). Alternatives 3 and 5 produce outcomes similar to Alternative 1. Alternatives 2, 4, 6, and 7 result in outcomes at or above current conditions because of increased large snags, increased late-seral habitat, reduced timber harvest levels, reduced human disturbance, improved riparian conditions, and reduced areas of high road density.

Hoary bat. The range of the hoary bat encompasses the entire Basin. This bat is a wide-ranging and long-lived species (20-year longevity). An Oregon study suggests that male hoary bats prefer Douglas-fir/western hemlock forests that are older than 200 years. Older trees most likely provide shelter, open space to gain flight when leaving the roost, and immediate accessibility to the roost site upon return (Perkins and Cross 1988).

Panel members considered late-seral habitat, snags, and riparian habitat of greatest significance in evaluating alternatives. As a result, habitat on

BLM- and Forest Service-administered lands was judged to have been reduced from Outcome 2 under historic conditions, to approximately Outcome 3 currently. Alternatives 1, 2, 3, and 5 were projected to result in continued habitat reduction on Federal lands, whereas Alternatives 4, 6, and 7 were projected to result in slight improvements in habitat conditions.

Long-eared bat. The range of the long-eared bat encompasses the entire Basin. Like other members of the genus *Myotis,* long-eared bats are detected in all stands with a variety of structures, but are most often detected in mature stands (Erickson and West, in press). In New Mexico, maternity roosts of long-eared myotis were located in live and dead junipers. Hibernacula of long-eared myotis in northwest California were located in limestone caves that were 5 to 150 meters from permanent streams (Marcot 1984). In a search of 650 caves and mines and 70 buildings in the Pacific Northwest during the winters of 1982 to 1989, long-eared bats were found in caves and one garage (Perkins and others 1990). Panelists indicated that roosting within the assessment area may be occurring in rocks because preferred habitat is not available. Important factors in evaluating alternatives for this species were maintenance of mine openings/cliffs/caves/talus, riparian condition (structural and vegetative diversity), protection of intermittent streams (these bats glean in foliage of riparian zones), and old forest physiology and structures including snags. As a result, the effects of the alternatives are similar to those described for the hoary bat.

Figure 4.36 Bats

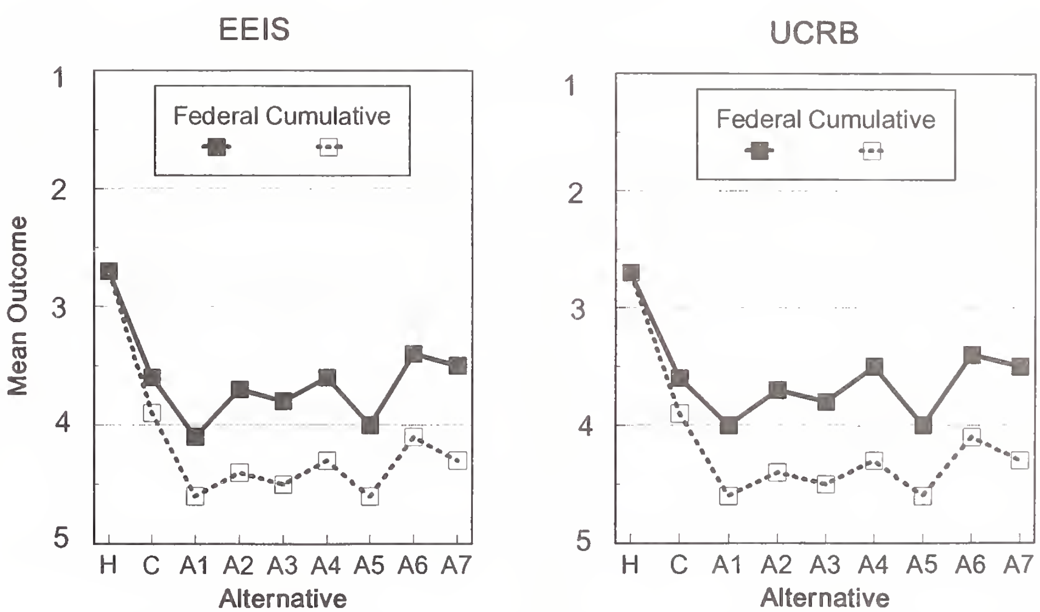

Figure 4.36. Mean outcome scores averaged over eight species of bats in the EEIS and UCRB planning areas for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.37 Bats

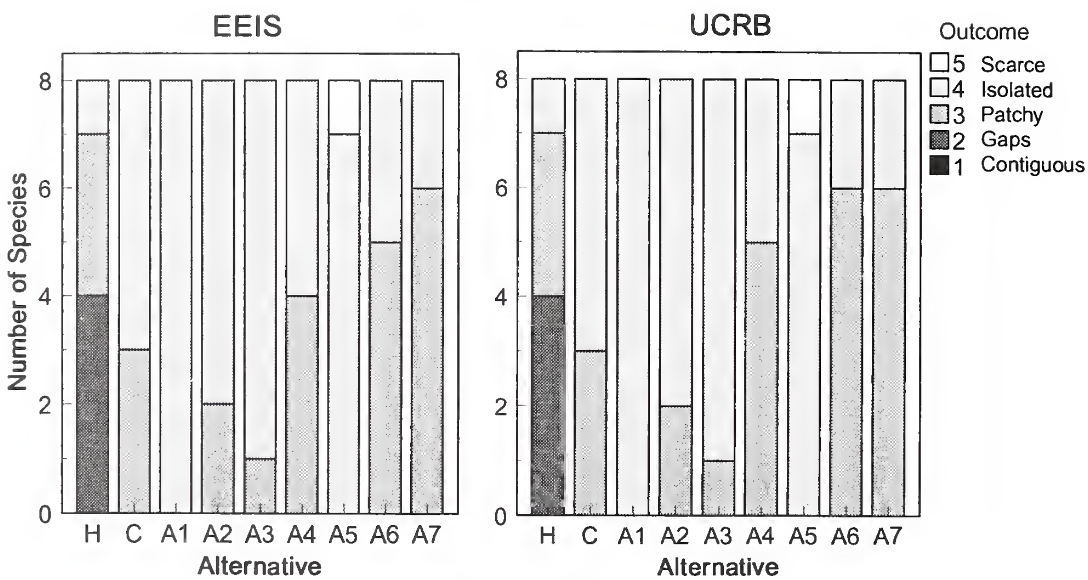

Figure 4.37. Frequency distribution of mean habitat outcome scores for eight species of bats on Federal lands in the EEIS and UCRB planning areas for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.38 Bats
Change from Current to Future

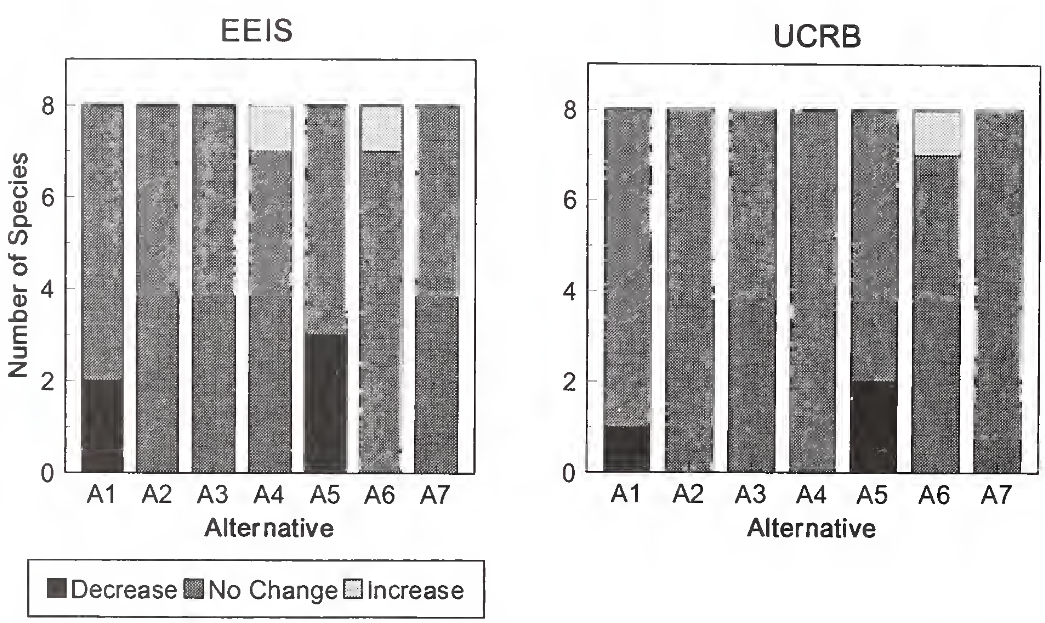

Figure 4.38. Departure of habitat outcomes on Federal lands from current conditions to each alternative for eight species of bats in the EEIS and UCRB planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

Table 4.17. Mean likelihood scores of viability outcomes for bats and small mammals for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means are calculated from the individual likelihood scores of panelists.

				Period / Alternative[4]								
Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
BAT	Fringed myotis	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	35	0	0	1	0	2	0	5	7
			3	63	33	17	43	22	43	10	47	45
			4	2	60	47	49	55	43	50	41	42
			5	0	7	36	7	23	12	40	7	6
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	35	0	0	0	0	0	0	0	0
			3	63	22	0	0	0	3	0	15	10
			4	2	65	20	37	38	47	30	48	40
			5	0	13	80	63	62	50	70	37	50
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	28	0	0	1	0	5	0	8	7
			3	70	33	17	43	32	48	30	54	45
			4	2	60	48	50	57	45	46	36	42
			5	0	7	35	6	11	2	24	2	6
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	35	0	0	0	0	0	0	0	0
			3	63	22	0	0	0	3	0	15	10
			4	2	65	22	43	40	47	35	53	43
			5	0	13	78	57	60	50	65	32	47
BAT	Hoary bat	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	78	6	0	10	0	14	0	24	22
			3	22	70	43	40	44	50	40	47	34
			4	0	22	47	36	48	31	40	26	28
			5	0	2	10	14	8	5	20	3	16
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	78	0	0	0	0	0	0	0	0
			3	22	56	13	10	14	20	8	37	18
			4	0	30	37	48	38	51	30	42	52
			5	0	14	50	42	48	29	62	21	30
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	78	4	0	6	0	14	0	24	20
			3	22	70	45	40	48	49	40	44	30
			4	0	24	48	42	33	33	46	26	36
			5	0	2	7	12	19	4	14	6	14
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	78	0	0	0	0	0	0	0	0
			3	22	56	5	8	8	20	8	36	17
			4	0	30	40	50	40	54	31	43	53
			5	0	14	55	42	52	26	61	21	30
BAT	Long-eared myotis	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	62	0	0	5	0	10	0	15	10
			3	38	50	36	47	45	50	39	50	50
			4	0	44	56	37	46	35	56	30	30
			5	0	6	8	11	9	5	5	5	10

Table 4.17 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	62	0	0	0	0	0	0	0	0
			3	38	28	8	16	10	19	6	29	21
			4	0	56	38	42	44	48	40	43	51
			5	0	16	54	42	46	33	54	28	28
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	62	0	0	5	0	5	0	15	10
			3	38	50	37	47	46	55	40	50	50
			4	0	44	57	37	47	35	48	30	30
			5	0	6	6	11	7	5	12	5	10
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	62	0	0	0	0	0	0	0	0
			3	38	28	8	10	10	19	10	29	21
			4	0	56	39	43	45	48	36	42	49
			5	0	16	53	47	45	33	54	29	30
BAT	Long-legged myotis	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	65	0	0	5	0	14	0	20	13
			3	35	44	24	44	52	56	34	62	45
			4	0	46	54	42	36	30	54	18	42
			5	0	10	22	9	12	0	12	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	65	0	0	0	0	0	0	0	0
			3	35	23	0	10	5	5	0	19	15
			4	0	58	30	44	43	61	30	46	50
			5	0	20	70	46	53	34	70	35	35
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	65	0	0	5	0	11	0	16	13
			3	35	44	35	44	54	60	45	64	50
			4	0	46	46	45	36	25	50	18	30
			5	0	10	19	6	10	4	5	2	7
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	65	0	0	0	0	0	0	0	0
			3	35	23	0	5	5	5	0	19	15
			4	0	58	31	41	44	59	30	50	53
			5	0	20	69	54	51	36	70	31	33
BAT	Pale western big-eared bat	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	6	0	0	0	0	0	0	0	0
			3	78	12	2	12	10	13	8	25	20
			4	14	72	52	78	64	78	58	67	69
			5	2	16	46	10	26	9	34	8	11
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	6	0	0	0	0	0	0	0	0
			3	78	12	0	0	0	2	0	5	3
			4	14	68	24	38	44	46	20	58	40
			5	2	20	76	62	56	52	80	37	57

Table 4.17 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	6	0	0	0	0	0	0	0	0
			3	78	12	2	12	12	13	8	35	30
			4	14	72	54	78	64	79	58	61	59
			5	2	16	44	10	24	8	34	4	11
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	6	0	0	0	0	0	0	0	0
			3	78	12	0	0	0	2	0	5	3
			4	14	70	25	39	45	44	20	59	41
			5	2	18	75	61	55	54	80	36	56
BAT	Silver-haired bat	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	52	2	0	5	5	15	0	18	10
			3	46	54	30	62	65	63	49	65	63
			4	2	44	48	22	26	18	38	16	22
			5	0	0	22	11	4	4	13	1	5
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	0	0	2	0	7	0
			3	40	40	7	22	16	26	8	41	18
			4	0	46	42	47	37	32	33	37	43
			5	0	14	51	31	47	40	59	15	39
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	52	2	0	5	8	18	8	22	10
			3	46	54	34	60	62	61	41	65	62
			4	2	44	44	29	26	17	31	10	25
			5	0	0	22	6	4	4	20	3	3
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	0	0	2	0	7	0
			3	40	40	7	19	16	26	8	40	18
			4	0	46	43	45	37	33	36	37	43
			5	0	14	50	36	47	39	56	16	39
BAT	Spotted bat	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	5	5	3	3	0	3	0	3	5
			4	90	75	55	63	53	65	45	73	75
			5	5	20	43	35	48	33	55	25	20
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	5	0	0	0	0	0	0	0	0
			4	90	60	43	48	35	53	30	63	55
			5	5	40	58	53	65	48	70	38	45
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	5	5	3	3	0	3	0	3	5
			4	90	75	58	65	53	68	45	75	75
			5	5	20	40	33	48	30	55	23	20
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	5	0	0	0	0	0	0	0	0
			4	90	60	45	50	35	55	33	65	55
			5	5	40	55	50	65	45	68	35	45

Table 4.17 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
BAT	Western small-footed myotis	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	80	0	0	10	0	0	0	10	10
			3	20	70	0	60	50	50	0	60	60
			4	0	30	70	20	30	30	70	20	30
			5	0	0	30	10	20	20	30	10	0
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	80	0	0	10	0	0	0	10	10
			3	20	70	0	60	50	50	0	60	60
			4	0	30	70	20	30	30	70	20	30
			5	0	0	30	10	20	20	30	10	0
SMM	Northern flying squirrel	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	90	15	0	18	15	24	4	30	25
			3	10	40	29	51	55	51	49	54	54
			4	0	33	51	21	20	20	38	10	21
			5	0	13	20	10	10	5	9	6	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	83	10	0	0	0	0	0	0	0
			3	18	43	5	18	10	18	10	25	20
			4	0	33	43	49	48	44	39	48	49
			5	0	15	53	34	43	39	51	28	31
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	90	15	0	21	16	25	5	28	26
			3	10	40	40	45	45	53	50	55	55
			4	0	33	32	30	30	20	25	15	10
			5	0	13	28	4	9	2	20	2	9
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	83	10	0	0	0	0	0	0	0
			3	18	45	5	13	10	20	10	25	20
			4	0	33	46	53	51	45	43	49	49
			5	0	13	49	35	39	35	48	26	31
SMM	Pygmy rabbit	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	40	0	0	0	0	0	0	0	0
			4	50	50	50	50	50	50	50	50	50
			5	10	50	50	50	50	50	50	50	50
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	40	0	0	0	0	0	0	0	0
			4	50	50	50	50	50	50	50	50	50
			5	10	50	50	50	50	50	50	50	50
SMM	White-tailed jackrabbit	EEIS BLM/FS	1	20	0	0	0	0	0	0	0	0
			2	80	20	20	20	20	20	20	20	20
			3	0	80	80	80	80	80	80	80	80
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.17 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	20	0	0	0	0	0	0	0	0
			2	80	10	10	10	10	10	10	10	10
			3	0	20	20	20	20	20	20	20	20
			4	0	60	60	60	60	60	60	60	60
			5	0	10	10	10	10	10	10	10	10
		UCRB BLM/FS	1	20	0	0	0	0	0	0	0	0
			2	80	20	20	20	20	20	20	20	20
			3	0	80	80	80	80	80	80	80	80
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	20	0	0	0	0	0	0	0	0
			2	80	10	10	10	10	10	10	10	10
			3	0	20	20	20	20	20	20	20	20
			4	0	60	60	60	60	60	60	60	60
			5	0	10	10	10	10	10	10	10	10

[1]Group: BAT - bat; SMM - small mammal.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[4]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[5]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

Long-legged bat. The range of the long-legged bat encompasses the entire Basin. A search of 650 caves and mines and 70 buildings in the Pacific Northwest found long-legged myotis to be the only species hibernating in a cluster (Perkins and others 1990). A radio-telemetry study of female long-legged bats in the central Cascades of Oregon suggested a non-random pattern of day roost selection by individual bats. Bats radio-marked at the same night roost were generally found at separate day roosts. The study recommended maximizing day roost opportunities by managing for both solitary and multiple clusters of day roost structures throughout forested drainages of the central Oregon Cascades (Ormsbee, in press). A second study in the central Cascades indicated that long-legged myotis differentially select larger bridges (which maintain higher night-time temperatures than do smaller bridges) and that males show a strong tendency to roost alone while clusters were almost exclusively composed of females (Perlmeter, in press). In a southern Alberta, Canada study, long-legged myotis fed high above ground and along cliff edges and the diet was primarily Lepidopteran moths (Saunders and Barclay 1992). The types of broad habitats and the pattern of panelists judgments were similar to those described for the hoary bat.

Pale western big-eared bat. The range of the pale western big-eared bat encompasses the entire Basin. The distribution is highly dependent on caves and mines and, to a lesser extent, forest management practices that affect foraging areas. The two major actions that have historically affected the pale western big-eared bat have been disturbance and destruction of roost sites. In a stand-level survey of bat activity within managed forests in the Pacific Northwest (1993-1994) the

highest detection rates were in clearcut stands. No detections were made in young, unthinned stands (Erickson and West, in press). Hibernacula of the species were studied on the Shasta-Trinity National Forest in four limestone caves (Marcot 1984). Pale western big-eared bats in these hibernacula were found singly or in groups of 3 to 50 individuals.

Important features of the alternatives that panelists considered for this species were large-diameter snag densities, maintaining mine openings/cliffs/caves/talus, riparian condition (structural and vegetative diversity), protection of intermittent streams (these bats glean in foliage of riparian zone), and projected road densities. Historic habitat approximated Outcome 3. Current habitat has declined to Outcome 4. Alternatives 1, 3, and 5 would continue to reduce roost site availability and increase levels of disturbance resulting in reductions in habitat on BLM- and FS-administered land. Alternatives 2 and 4 would maintain current habitat levels by improving snag and riparian conditions and reducing the density of open roads. It was assumed that cave and mine protection would increase as part of the alternatives. Alternatives 6 and 7 were judged to slightly improve habitat conditions on Federal lands for pale western bit-eared bat by implementing additional broad-scale ecosystem restoration or retention and increasing protection of cave/mine/cliff habitat.

Silver-haired bat. The range of the silver-haired bat encompasses the entire Basin. In the Pacific Northwest, a stand-level survey of bat activity within managed forests (1993-1994) detected silver-haired bats most frequently in clearcuts and did not record them in mature stands (Erickson and West, in press). However, in an Oregon study, Perkins and Cross (1988) found a significant difference in captures of silver-haired bats in Douglas-fir stands, 100 years old or greater, when compared with ponderosa pine stands of the same age and younger stands of Douglas-fir and ponderosa pine. The bark of older Douglas-fir trees tends to pull away from the bole providing crevices for shelter. The oldest Douglas-fir stands provide the greatest number of snags with exfoliating bark, cracks, and excavations of cavity-nesting birds. Older ponderosa pine does not provide as many roost sites because bark ridges are not as deep as are those of Douglas-fir, and bark exfoliation occurs in thin plates and does not create deep crevices. In the southern-Washington Cascades and the Oregon Coast Range, bat activity was greater in old-growth Douglas-fir forests than in mature or young tree stands. The high level of activity in these stands is probably due to the increased diversity and/or abundance of day roosts as compared with young and mature stands. Day roosts of five silver-haired bats in northeastern Oregon were located by radiotelemetry from 1994 to 1995. All roost sites were in trees ranging from 15 to 22 inches dbh, and from 18 to 82 feet in height. Eight of the 12 roost trees used by silver-haired bats were snags and all were on forested slopes (Betts, in press). Roost site preferences of silver-haired bats were studied just north of the United States border in southern British Columbia where approximately 15 roost trees were found. With two exceptions, all roosts were in abandoned woodpecker cavities and were commonly found in both aspen and Douglas-fir (Vonhof, in press).

Panelists determined that features of the alternatives that increased large trees, snags, and riparian conditions would be most beneficial to this species. Habitat was judged to have declined from between Outcomes 2 and 3, to between Outcomes 3 and 4, from historic to current. Alternatives 1 and 5 were judged to result in further declines by year 100, largely because fewer snags would be provided, and riparian conditions were not expected to improve from current conditions. All other alternatives were expected to improve conditions for the species because of increased riparian quality and diversity, increased large snag densities, and increased late-seral forests.

Table 4.18. Mean viability outcomes for habitat and populations of bats and small mammals for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

			Period / Alternative[3]								
Group[1]	Species Name	Area[2]	H	C	A1	A2	A3	A4	A5	A6	A7
BAT	Fringed myotis	EEIS BLM/FS[4]	2.7	3.7	4.2	3.6	4.0	3.7	4.3[5]	3.5	3.5
		EEIS CumEff	2.7	3.9	4.8[5]	4.6[5]	4.6[5]	4.5[5]	4.7[5]	4.2	4.4
		UCRB BLM/FS[4]	2.7	3.7	4.2	3.6	3.8	3.4	3.9	3.3	3.5
		UCRB CumEff	2.7	3.9	4.8[5]	4.6[5]	4.6[5]	4.5[5]	4.7[5]	4.2	4.4
BAT	Hoary bat	EEIS BLM/FS[4]	2.2	3.2	3.7	3.5	3.6	3.3	3.8[5]	3.1	3.4
		EEIS CumEff	2.2	3.6	4.4[5]	4.3[5]	4.3[5]	4.1[5]	4.5[5]	3.8	4.1[5]
		UCRB BLM/FS[4]	2.2	3.2	3.6	3.6	3.7	3.3	3.7[5]	3.1	3.4
		UCRB CumEff	2.2	3.6	4.5[5]	4.3[5]	4.4[5]	4.1	4.5[5]	3.9	4.1[5]
BAT	Long-eared myotis	EEIS BLM/FS[4]	2.4	3.6	3.7	3.5	3.6	3.4	3.7	3.3	3.4
		EEIS CumEff	2.4	3.9	4.5[5]	4.3	4.4	4.1	4.5[5]	4.0	4.1
		UCRB BLM/FS[4]	2.4	3.6	3.7	3.5	3.6	3.4	3.7	3.3	3.4
		UCRB CumEff	2.4	3.9	4.5[5]	4.4	4.4	4.1	4.4[5]	4.0	4.1
BAT	Long-legged myotis	EEIS BLM/FS[4]	2.4	3.7	4.0	3.6	3.6	3.2[5]	3.8	3.0[5]	3.3
		EEIS CumEff	2.4	4.0	4.7[5]	4.4	4.5[5]	4.3	4.7[5]	4.2	4.2
		UCRB BLM/FS[4]	2.4	3.7	3.8	3.5	3.6	3.2	3.6	3.1[5]	3.3
		UCRB CumEff	2.4	4.0	4.7[5]	4.5	4.5	4.3	4.7[5]	4.1	4.2
BAT	Pale western big-eared bat	EEIS BLM/FS[4]	3.1	4.0	4.4	4.0	4.2	4.0	4.3	3.8	3.9
		EEIS CumEff	3.1	4.1	4.8[5]	4.6[5]	4.6	4.5	4.8[5]	4.3	4.5
		UCRB BLM/FS[4]	3.1	4.0	4.4	4.0	4.1	4.0	4.3	3.7	3.8
		UCRB CumEff	3.1	4.1	4.8[5]	4.6[5]	4.6	4.5	4.8[5]	4.3	4.5
BAT	Silver-haired bat	EEIS BLM/FS[4]	2.5	3.4	3.9[5]	3.4	3.3	3.1	3.6	3.0	3.2
		EEIS CumEff	2.4	3.7	4.4[5]	4.1	4.3[5]	4.1	4.5[5]	3.6	4.2
		UCRB BLM/FS[4]	2.5	3.4	3.9	3.4	3.3	3.1	3.6	2.9	3.2
		UCRB CumEff	2.4	3.7	4.4[5]	4.2	4.3[5]	4.1	4.5[5]	3.6	4.2
BAT	Spotted bat	EEIS BLM/FS[4]	4.0	4.2	4.4	4.4	4.5	4.3	4.6	4.3	4.2
		EEIS CumEff	4.0	4.4	4.6	4.6	4.7	4.5	4.7	4.4	4.5
		UCRB BLM/FS[4]	4.0	4.2	4.4	4.3	4.5	4.3	4.6	4.2	4.2
		UCRB CumEff	4.0	4.4	4.6	4.5	4.7	4.5	4.7	4.4	4.5
BAT	Western small-footed myotis	EEIS BLM/FS[4]	2.2	2.3	4.3[5]	3.3	3.7	3.7	4.3[5]	3.3	3.2
		UCRB BLM/FS[4]	2.2	3.3	4.3[5]	3.3	3.7	3.7	4.3[5]	3.3	3.2
SMM	Northern flying squirrel	EEIS BLM/FS[4]	2.1	3.5	3.9	3.2	3.3	3.1	3.5	2.9[5]	3.0[5]
		EEIS CumEff	2.2	3.6	4.5[5]	4.2[5]	4.4[5]	4.3[5]	4.4[5]	4.1[5]	4.1[5]
		UCRB BLM/FS[4]	2.1	3.5	3.9	3.2	3.3	3.0	3.6	2.9[5]	3.0
		UCRB CumEff	2.2	3.5	4.4[5]	4.3[5]	4.3[5]	4.2[5]	4.4[5]	4.0	4.1[5]
SMM	Pygmy rabbit	EEIS BLM/FS	3.7	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
		UCRB BLM/FS	3.7	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
SMM	White-tailed jackrabbit	EEIS BLM/FS	1.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
		EEIS CumEff	1.8	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
		UCRB BLM/FS	1.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
		UCRB CumEff	1.8	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7

[1]Group: BAT - bat; SMM - small mammal.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[4]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

[5]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table may be misleading.

Spotted bat. The range of the spotted bat encompasses the entire EEIS area and western and southern Idaho. In British Columbia, spotted bats were found to roost in cliff faces and forage alone in a variety of habitats, most actively over marshes and open ponderosa pine woodlands (Wai-Ping and Fenton 1989). Surveys in Northwestern Colorado at Dinosaur National Monument found spotted bats using a wide range of habitats, from pinyon-juniper to riparian zones, from dusk to early morning hours (Navo and others 1992). Spotted bats in British Columbia fed mainly on moths (Wai-Ping and Fenton 1989).

The most important feature of the alternatives for the spotted bat was protection of high cliff/forest interfaces at the tops of canyons. The spotted bat is patchily distributed where this high cliff/forest interface is found. Because the species is very sensitive to disturbance, a vigorous survey of this habitat is recommended in order to identify specific areas for protection. Panelists judged historic distribution to approximate Outcome 4 because of extremely patchy distribution throughout the Basin. Habitat condition is judged to have declined due to recreational use, timber harvest, and other disturbance factors near cliffs. No alternatives were judged to improve current habitat conditions. Alternatives 6 and 7 were considered to maintain current habitat.

Western small-footed bat. The range of the western small-footed myotis encompasses the entire Basin. During a search of 650 caves and mines and 70 buildings in the Pacific Northwest (Perkins and others 1990), western small-footed bats were found using caves and mines as hibernacula. Comparatively, in Pennsylvania, 52 percent of occupied hibernacula were small caves of less than 150 meters in length (Dunn and Hall 1989). Gates and others (1984) recommended conducting cave surveys, implementing stronger efforts to diminish or alleviate disturbance, acquiring or protecting caves with 30 or more individuals, and monitoring populations in minor and major hibernacula.

The outcomes for western small-footed bat assumed that specific cave/mine/cliff/talus standards would be developed for the alternatives that are consistent with the broad alternative themes. Current habitat is judged to have declined from historic conditions (from Outcome 2 to Outcome 3). Further declines were judged to be likely under Alternatives 1, 3, 4, and 5. Alternatives 2, 6, and 7 were judged likely to result in higher outcomes than current conditions through reduction of human disturbance and by protection of cave/mine sites.

Other Small Mammals

Introduction—The species initially considered by the small mammal panel were selected through the process described in "Methods for Assessing Effects on Terrestrial Species." Species included in the analysis were Preble's shrew, pygmy rabbit, Wyoming ground squirrel, white-tailed jackrabbit, northern flying squirrel, and Uinta ground squirrel. Preble's shrew, pygmy rabbit, and Wyoming ground squirrel were initially included because they were Candidate species (Category 2 or 3) for listing by the U.S. Fish and Wildlife Service. The white-tailed jackrabbit, northern flying squirrel, and Uinta ground squirrel were included because previous analyses suggested that habitat may have declined from historic to current conditions or was projected to decline under one or more alternatives.

Methods—During the panel discussions, Preble's shrew was dropped from further evaluation because fine-scale analysis (at the 4th field HUC watershed or smaller scale) would be necessary to address this species because of its local distribution within the Basin. Wyoming ground squirrel was dropped from analysis because the panelists agreed that major changes in habitat are not expected and agriculture probably benefits the species. Uinta ground squirrel was dropped from the analysis because panelists did not have the background or habitat information to evaluate the effects of the alternatives on the species. We recommend that this species be analyzed at a finer scale.

Results—After reviewing results of the expert panel, the SIT adjusted some of the outcomes for the evaluation of habitat on BLM- and Forest Service-administered lands for the northern flying squirrel. These adjustments reflected additional information on Alternatives 2 and 7 that was obtained after the panel deliberations had concluded. The information included corrections of late-seral habitat projections, and clarification of riparian standards. An underestimation of large snag retention under the alternatives at year 100 and the tendency of panelists to emphasize populations rather than habitat conditions in the analysis of habitat on BLM- and FS-administered lands were also addressed. Detailed results are shown in tables 4.17 and 4.18.

Discussion—

Pygmy rabbit. The pygmy rabbit is found primarily in the upland shrub habitats of southeastern Oregon, southwestern Idaho, and northern Nevada. The species is patchily distributed. There are also remnant populations persisting in central eastern Washington (approximately 250 animals). The pygmy rabbit is strongly dependant on sagebrush, which comprises 99 percent of its winter diet. Dense sagebrush and relatively deep, loose soil are important characteristics of pygmy rabbit habitat (Washington Department of Wildlife 1993).

Agricultural development, sagebrush conversion, and sagebrush removal were the primary factors considered in evaluating conditions for pygmy rabbits. Panelists were only able to assess conditions for pygmy rabbit on Federal land (see table 4.17). The large historic decline in pygmy rabbit habitat reflects a loss of big sagebrush. The alternatives were not considered likely to significantly reduce habitat from current conditions. Site-specific analysis may be necessary to fully address this species including the assessment of cumulative effects.

White-tailed jackrabbit. White-tailed jackrabbits use upland herblands throughout the Basin. Past agricultural conversion, intensive grazing, and fire suppression were the primary factors considered in the evaluation of alternatives. The results for Federal lands indicate that habitat has declined significantly from historic to current conditions (table 4.17). Changes due to cumulative effects have been even greater. No distinct changes are predicted under the alternatives. Cumulative effects on populations reflect the historic agricultural conversion from rangeland to row crops and no further significant changes are predicted.

Northern flying squirrel. The range of the northern flying squirrel encompasses forest lands throughout both EIS areas. Panelists identified multi-storied forest stands as suitable habitat for northern flying squirrels, and highlighted the importance of riparian zones for the species. Large live trees and snags are breeding habitat for the northern flying squirrels. Key considerations for snags include such features as placement, decay state, diameter, height, proximity to other snags, presence of bark, and so on. Fungi are an important food item during much of the year and are more abundant in moist environments and near down wood. This food source can be reduced as a result of high-temperature burning and compaction.

The northern flying squirrel is sensitive to riparian habitat reduction, snag loss, and forest fragmentation. Habitat on Federal lands is estimated to have declined from 90 percent likelihood of Outcome 2 under historic conditions to a current level of 73 percent likelihood of Outcomes 3 and 4 (table 4.17). Alternatives 1 and 5 are expected to result in a continuing trend toward habitat isolation, while Alternatives 2, 3, 4, 6, and 7 are expected to maintain or improve conditions (table 4.18).

Cumulative effects were judged to result in continued population decline under all alternatives as a result of fragmentation of habitat on non-Federal land (see weighted mean outcomes in table 4.18).

Carnivores

Introduction—Twenty-two species of carnivores were identified as being present within the assessment area. Of these, six were selected for detailed analysis because they are listed under the Endangered Species Act (ESA), are candidates for listing, are listed as sensitive under FS or BLM policy, or have been the subject of lawsuits. Additionally, three of these species, fisher, American marten, and lynx, are associated with late-seral forests for at least part of their habitat requirements. All six species are known to or are suspected to have declined in abundance within the assessment area since European settlement.

Methods—Outcomes projected by the expert panel were adjusted by the Science Team for marten, fisher, lynx, and wolverine. The adjustments were based on additional information on species habitat requirements from recently published reports, consultation with additional species experts, and additional information regarding the alternatives obtained following the panel deliberations.

Results—The viability outcomes for carnivores significantly declined (1.0 to 0.5 units) from the historical period (tables 4.19 and 4.20, and figs. 4.39 and 4.40). Historical distributions on average were described by Outcome 2 or 3, whereas current distributions are characterized by Outcome 4 or 5. In general, the mean outcome for all carnivores under the alternatives would not be significantly different (+ > 0.5 units) from current conditions (fig. 4.39). However, Alternatives 4, 6, and 7 would result in increased viability for one to two species on BLM- and FS-administered lands (fig. 4.41). Generally, projected outcomes were higher in the UCRB EIS area, but the relative effects of the alternatives were the same in both the UCRB EIS and EEIS areas. Lynx was an exception since both areas had very similar outcome scores.

Discussion—

Fisher. Declines in fisher populations in the assessment area have been previously described (Aubry and Houston 1992, Weckwerth and Wright 1968). The decline appears to be a result of heavy trapping and habitat deterioration (Powell and Zielinski 1994). Reintroductions of fisher in the assessment area began in the late 1950s and continued through the early 1990s. Regulating trapping seasons in Idaho and Montana to prevent overharvest may result in slow expansion of populations in these areas (Powell and Zielinski 1994).

Fishers are found in a diversity of forest types but are most commonly associated with riparian habitats in landscapes dominated by mature conifer forests and late-seral forests (Aubry and Houston 1992, Buskirk and Powell 1994, Jones and Garton 1994, Powell and Zielinski). Studies in northern California (Buck and others 1994) investigated fisher use of harvested forests. They found different use of habitats by fisher within lightly harvested and heavily harvested areas. They also reported that management practices that reduce mature forest structure and increase the proportion of hardwoods result in sub-optimal fisher habitat. Jones and Garton (1994) suggested that the inclusion of early- and mid-seral forests may be important components of fisher habitat, providing prey diversity. Jones (1991) reported of young forest use by fisher in winter, but noted that fisher selected locations within the young forests having higher availability of large-diameter trees, snags, and down woody material.

Riparian standards associated with Alternatives 2, 3, 4, 6 and 7 would result in the greatest improvement in riparian habitat conditions. Alternatives 3, 4, and 6 would promote restoration of the historic distribution of late-seral habitats and protect riparian habitat, thus, these alternatives are predicted to improve fisher habitat the most. Alternative 7 would establish reserves of late-seral conifer forests, but the locations are not in primary fisher habitat. This alternative would also restrict activity in unroaded areas greater than 1,000 acres and would retain existing late-seral vegetation. Alternative 1 would provide for only limited protection of riparian habitats and would result in continued fragmentation and loss of late-

seral forests. Alternative 5 would emphasize commodity production in the primary fisher range and would provide little protection to riparian habitats.

Alternatives 4 and 6 in the EEIS area are predicted to improve fisher habitat above current conditions and result in isolated patches of habitat with limited possibility for interactions between local populations. Alternatives 1 and 5 would reduce habitat quality to small isolated patches with no potential for interactions and a high likelihood of extirpation in 100 years. In the UCRB EIS area Alternatives 2, 3, 4, and 6 would improve habitat above current levels, but habitat would still remain as isolated islands with limited potential for interactions between populations. Alternatives 1, 5, and 7 would reduce habitat to small isolated islands with little potential for interactions between local populations and little opportunity for recolonization of habitats.

American marten. American marten are closely associated with late-seral conifer forests with complex physical structure near the ground (Buskirk and Powell 1994). Baker (1992) reported use by marten of second-growth vegetation that had small patches of old forest, large stumps, and logs remaining in the treated area. Mesic habitats, especially riparian habitat, are selected over xeric conditions for foraging and resting (Buskirk and others 1989, Buskirk and Powell 1994, Spencer and others 1983), probably because of the greater abundance of habitat structures that are associated with riparian areas. Open areas without overhead cover are infrequently used by martens, probably due to increased risk of predation.

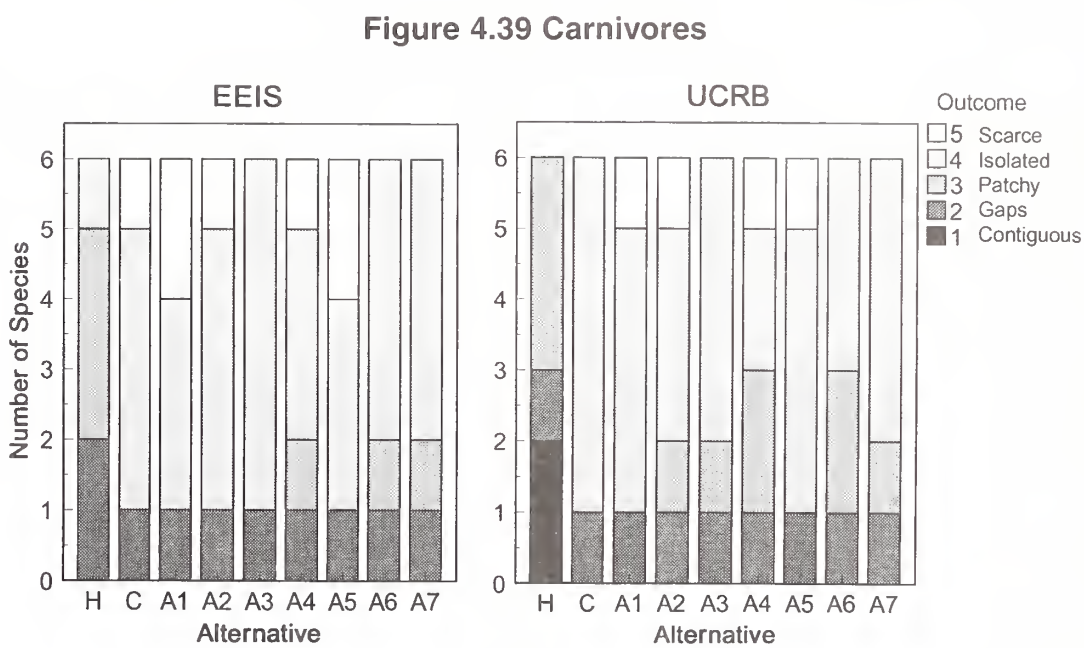

Figure 4.39. Frequency distribution of mean habitat outcome scores for six species of carnivores on Federal lands in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.40 Carnivores

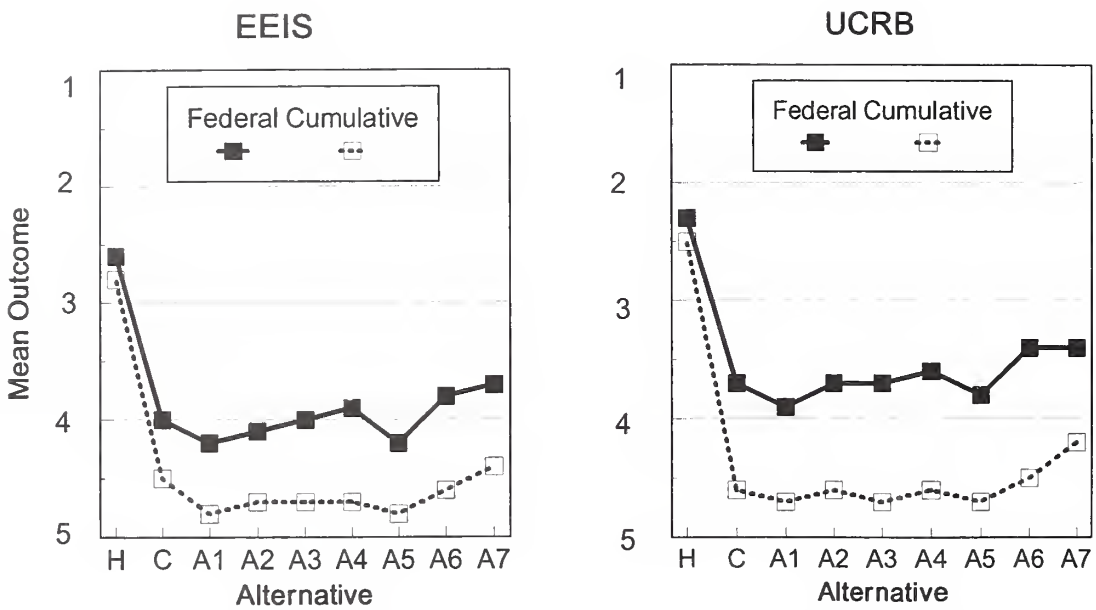

Figure 4.40. Mean outcome scores averaged over six species of carnivores in the EEIS and UCRB planning areas for historic, current, and future conditions under seven alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.41 Carnivores
Change from Current to Future

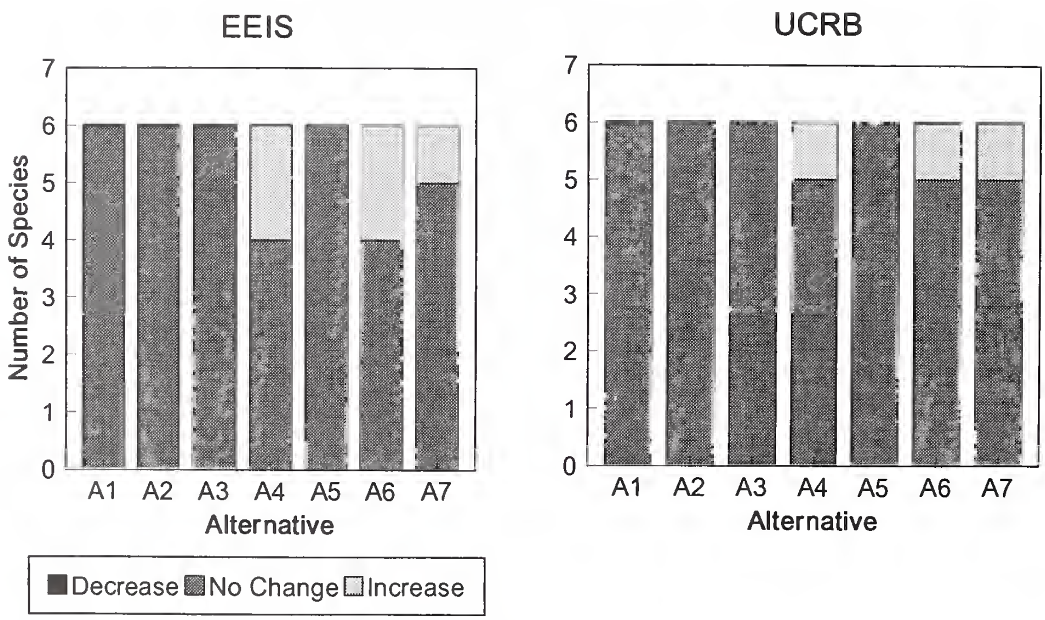

Figure 4.41. Departure of habitat outcomes on Federal lands from current conditions to each alternative for six species of carnivores in the EEIS and UCRB planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

Alternative 7 is predicted to provide the best marten habitat because of designation of reserves, retention of large, unroaded areas and late-seral forests, and riparian protection. Alternatives 4 and 6 contain standards to protect riparian habitat and actively manage conifer forests for late-seral conditions. Both of these alternatives would result in a less-fragmented landscape and would retain large snags and down wood. Therefore, Alternatives 4 and 6 would improve habitat conditions from current. Alternatives 2 and 3 are predicted to maintain or slightly improve habitat from current by retaining late-seral conifer forests in the range of historical conditions and by providing strong riparian protection. These alternatives also provide for the beneficial retention of large snags and moderate amounts of down wood across the landscape. Alternatives 1 and 5 would result in continued fragmentation of late-seral forests and would not provide strong riparian protection.

Alternative 7, would restore marten habitat to near historic conditions by providing strict reserves. Alternatives 4 and 6 would restore habitat to provide more continuous distribution with greater opportunities for individuals to interact between populations than under current conditions. Alternatives 1, 2, 3, and 5 are projected to result in a decrease in marten habitat from current conditions and result in conditions that provide isolated habitats with limited opportunity for interactions between populations or the possibility of recolonization.

Lynx. Lynx are highly specialized predators and are closely associated with snowshoe hare populations (Koehler 1990, Koehler and Aubry 1994, Koehler and Brittell 1990). Exploitation for fur and deterioration of habitat conditions due to logging have been suggested as reasons for population declines and consequent population viability (Koehler 1987). Early-seral forests resulting from fire, timber harvest, disease and wind-throw provide habitat to support high densities of snowshoe hare and the best foraging conditions for lynx (Koehler 1990, Koehler 1991, Koehler and Brittell 1990).

Because of development on non-Federal lands, lynx habitat would largely remain under all alternatives as isolated islands with little opportunity for dispersal of individuals between local populations. Alternative 6 provides the greatest opportunity to improve lynx habitat from current conditions because the restoration strategy would be tested and refined under an adaptive management approach that would validate response of prey populations and lynx to various management techniques. Alternative 4, with similar outcomes after 100 years, may be too aggressive in the early decades and result in extensive and rapid modification of lynx and snowshoe hare habitat in population strongholds and little opportunity to validate management practices. Alternative 7 designates reserves in portions of important lynx range with a strategy for allowing natural fire that would result in improved habitat conditions for snowshoe hare and lynx. Alternative 3 is predicted to provide better conditions than alternatives other than 6 and 7, but only slight improvements over current conditions. Alternatives 1, 2, and 5 would result in further declines in lynx habitat resulting from continued fire suppression under Alternatives 1 and 2 and aggressive commodity production under Alternative 5.

Lynx habitat would remain as isolated patches under Alternative 7, but habitat within the patches should improve, resulting in larger within-patch sub-populations and increased dispersal to other habitats. Alternative 6 would restore habitat above current levels through management that would create more snowshoe hare habitat, and allow monitoring to assure objectives are attained. Alternatives 1, 2, 4, and 5 would result in a reduction of habitat from current conditions in the initial decades of implementation, which may create a bottleneck for lynx populations from which they may not be able to recover. In the short term (30 years), isolation of existing habitat patches would increase under management and result in limited opportunity for interactions between sub-populations. Opportunity for recolonization, once habitats are restored, would be limited.

Table 4.19. Mean likelihood scores of viability outcomes for carnivores and ungulates for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means are calculated from the individual likelihood scores of panelists.

				Period / Alternative[4]								
Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
CAR	American marten	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	50	4	2	4	4	4	2	4	20
			3	50	22	10	16	14	50	6	50	60
			4	0	42	36	40	38	46	36	46	20
			5	0	32	52	40	44	0	56	0	0
		EEIS CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	50	4	0	2	2	2	0	2	4
			3	50	22	8	8	8	12	8	13	21
			4	0	42	29	39	34	33	27	34	34
			5	0	32	63	51	56	53	65	51	41
		UCRB BLM/FS[5]	1	24	0	0	0	0	0	0	0	0
			2	42	12	2	6	6	20	12	20	40
			3	34	34	17	28	28	60	35	60	50
			4	0	26	41	40	40	20	27	20	10
			5	0	28	40	26	26	0	26	0	0
		UCRB CumEff[5]	1	24	0	0	0	0	0	0	0	0
			2	42	4	0	2	2	2	2	4	6
			3	34	16	16	18	18	21	13	25	44
			4	0	30	27	31	31	39	31	37	37
			5	0	50	57	49	49	38	54	34	13
CAR	Fisher	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	12	0	0	0	0	0	0	0	1
			3	22	2	1	4	5	28	1	28	12
			4	34	14	13	47	47	24	9	24	25
			5	32	84	86	49	48	48	90	48	62
		EEIS CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	12	0	0	0	0	0	0	0	0
			3	22	2	0	2	0	2	0	2	12
			4	34	10	8	10	6	10	6	10	20
			5	32	88	92	88	94	88	94	88	68
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	40	0	0	0	0	0	0	0	0
			3	40	40	20	70	70	70	40	70	20
			4	20	40	50	20	20	20	40	20	50
			5	0	20	30	10	10	10	20	10	30
		UCRB CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	40	0	0	0	0	0	0	0	0
			3	40	2	3	0	0	1	0	5	16
			4	20	14	22	34	23	31	23	34	43
			5	0	84	75	66	77	68	77	61	41
CAR	Gray wolf	EEIS BLM/FS	1	40	12	8	12	10	12	8	14	20
			2	50	42	42	46	42	47	42	46	48
			3	10	46	46	42	46	41	46	40	32
			4	0	0	4	0	2	0	4	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.19 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		EEIS CumEff	1	36	0	0	0	0	0	0	0	0
			2	48	4	2	4	2	6	2	8	10
			3	16	8	8	8	8	6	8	6	14
			4	0	42	43	42	43	44	43	41	44
			5	0	46	47	46	47	44	47	45	32
		UCRB BLM/FS	1	68	22	18	22	18	22	16	24	36
			2	30	43	44	43	44	43	44	42	39
			3	2	35	34	35	34	35	36	34	25
			4	0	0	4	0	4	0	4	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	68	4	0	0	0	0	0	0	0
			2	30	4	0	1	0	1	0	2	3
			3	2	4	8	9	10	9	8	9	16
			4	0	42	46	46	44	46	46	46	50
			5	0	46	46	44	46	44	46	43	31
CAR	Grizzly bear	EEIS BLM/FS	1	44	0	0	0	0	0	0	0	0
			2	44	0	0	0	0	0	0	0	4
			3	10	12	4	5	5	4	4	4	11
			4	2	40	47	47	47	50	47	50	49
			5	0	48	49	48	48	46	49	46	36
		EEIS CumEff	1	46	0	0	0	0	0	0	0	0
			2	46	0	0	0	0	0	0	0	2
			3	8	2	0	0	0	0	0	0	4
			4	0	8	6	8	8	8	8	9	19
			5	0	90	94	92	92	92	92	91	75
		UCRB BLM/FS	1	62	8	4	4	4	5	4	8	10
			2	32	4	6	8	6	6	6	6	4
			3	6	10	6	6	6	6	6	4	16
			4	0	38	44	42	44	43	44	42	40
			5	0	40	40	40	40	40	40	40	30
		UCRB CumEff	1	58	0	0	0	0	0	0	0	2
			2	32	0	0	0	0	0	0	4	4
			3	10	4	2	3	3	4	2	6	6
			4	0	8	10	9	9	8	10	4	8
			5	0	88	88	88	88	88	88	86	80
CAR	Lynx	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	10	0	0	0	4	0	0	2	2
			3	80	12	0	0	8	0	3	18	17
			4	10	40	42	42	42	42	22	44	41
			5	0	48	58	58	46	58	75	36	40
		EEIS CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	10	0	0	0	0	0	0	0	0
			3	80	0	4	4	3	4	0	0	0
			4	10	42	15	15	22	15	10	42	42
			5	0	58	81	81	75	81	90	58	58
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	10	0	0	0	4	0	0	4	2
			3	80	12	0	0	8	0	3	25	20
			4	10	40	50	50	42	42	22	40	44
			5	0	48	50	50	46	58	75	31	34

Table 4.19 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
		UCRB CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	10	0	0	0	0	0	0	0	0
			3	80	0	4	4	3	4	0	0	0
			4	10	40	15	15	22	15	10	42	42
			5	0	60	81	81	75	81	90	58	58
CAR	Wolverine	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	10	0	0	0	0	0	0	0	0
			3	80	12	4	5	5	4	4	4	11
			4	10	40	47	47	47	50	47	50	54
			5	0	48	49	48	48	46	49	46	35
		EEIS CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	36	0	0	0	0	0	0	0	19
			4	30	38	0	5	0	6	0	6	21
			5	34	62	100	95	100	94	100	94	60
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	10	4	7	8	8	9	8	9	9
			3	80	20	13	10	11	12	10	16	21
			4	10	44	41	42	44	43	42	44	50
			5	0	32	39	40	37	36	40	31	20
		UCRB CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	36	0	0	0	0	0	0	0	26
			4	30	4	2	10	2	8	2	10	23
			5	34	96	98	90	98	92	98	90	51
UNG	California bighorn sheep	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	0	0	0	0	0	0	0	0
			4	50	40	40	50	40	40	50	40	10
			5	0	60	60	50	60	60	50	60	90
		EEIS CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	0	0	0	0	0	0	0	0
			4	50	30	30	40	30	30	40	30	10
			5	0	70	70	60	70	70	60	70	90
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	0	0	0	0	0	0	0	0
			4	50	40	40	50	40	40	50	40	10
			5	0	60	60	50	60	60	50	60	90
		UCRB CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	0	0	0	0	0	0	0	0
			4	50	30	30	40	30	30	40	30	10
			5	0	70	70	60	70	70	60	70	90

Table 4.19 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
UNG	Pronghorn	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	10	0	0	0	0	0	0	0	0
			3	80	50	25	25	60	70	25	70	25
			4	10	50	60	60	40	30	60	30	60
			5	0	0	15	15	0	0	15	0	15
		EEIS CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	10	0	0	0	0	0	0	0	0
			3	80	20	10	10	10	10	10	10	10
			4	10	50	50	50	50	50	50	50	50
			5	0	30	40	40	40	40	40	40	40
		UCRB BLM/FS[5]	1	10	0	0	0	0	0	0	0	0
			2	80	60	20	20	65	70	20	70	20
			3	10	30	60	60	35	30	60	30	60
			4	0	10	20	20	0	0	20	0	20
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff[5]	1	10	0	0	0	0	0	0	0	0
			2	80	0	0	0	0	0	0	0	0
			3	10	60	10	10	10	10	10	10	10
			4	0	40	50	50	50	50	50	50	50
			5	0	0	40	40	40	40	40	40	40
UNG	Woodland caribou	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	50	0	0	0	0	0	0	0	46
			5	50	100	100	100	100	100	100	100	54
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	50	0	0	0	0	0	0	0	42
			5	50	100	100	100	100	100	100	100	58
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	50	0	0	0	0	0	0	0	46
			5	50	100	100	100	100	100	100	100	54
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	50	0	0	0	0	0	0	0	42
			5	50	100	100	100	100	100	100	100	58

[1]Group: CAR - carnivore; UNG - ungulate.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[4]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[5]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

Table 4.20. Mean viability outcomes for habitat and populations of mammalian carnivores and ungulates for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

			Period / Alternative[3]								
Group[1]	Species Name	Area[2]	H	C	A1	A2	A3	A4	A5	A6	A7
CAR	American marten	EEIS BLM/FS[4]	2.5	4.0	4.4	4.2	4.2	3.4[5]	4.5	3.4[5]	3.0[5]
		EEIS CumEff[4]	2.5	4.0	4.6[5]	4.4	4.4	4.4	4.6[5]	4.3	4.1
		UCRB BLM/FS[4]	2.1	3.7	4.2	3.9	3.9	3.0[5]	3.7	3.0[5]	2.7[5]
		UCRB CumEff[4]	2.1	4.3	4.4	4.3	4.3	4.1	4.4	4.0	3.6[5]
CAR	Fisher	EEIS BLM/FS[4]	3.9	4.8	4.9	4.5	4.4	4.2[5]	4.9	4.2[5]	4.5
		EEIS CumEff[4]	3.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.6
		UCRB BLM/FS[4]	2.8	3.8	4.1	3.4	3.4	3.4	3.8	3.4	4.1
		UCRB CumEff[4]	2.8	4.8	4.7	4.7	4.8	4.7	4.8	4.6	4.3[5]
CAR	Gray wolf	EEIS BLM/FS	1.7	2.3	2.5	2.3	2.4	2.3	2.5	2.3	2.1
		EEIS CumEff	1.8	4.3	4.4	4.3	4.4	4.3	4.4	4.2	4.0
		UCRB BLM/FS	1.3	2.1	2.2	2.1	2.2	2.1	2.3	2.1	1.9
		UCRB CumEff	1.3	4.2	4.4	4.3	4.4	4.3	4.4	4.3	4.1
CAR	Grizzly bear	EEIS BLM/FS	1.7	4.4	4.5	4.4	4.4	4.4	4.5	4.4	4.2
		EEIS CumEff	1.6	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.7
		UCRB BLM/FS	1.4	4.0	4.1	4.1	4.1	4.1	4.1	4.0	3.8
		UCRB CumEff	1.5	4.8	4.9	4.9	4.9	4.8	4.9	4.7	4.6
CAR	Lynx	EEIS BLM/FS[4]	3.0	4.4	4.6	4.6	4.3	4.6	4.7	4.1	4.2
		EEIS CumEff[4]	3.0	4.6	4.8	4.8	4.7	4.8	4.9	4.6	4.6
		UCRB BLM/FS[4]	3.0	4.4	4.5	4.5	4.3	4.6	4.7	4.0	4.1
		UCRB CumEff[4]	3.0	4.6	4.8	4.8	4.7	4.8	4.9	4.6	4.6
CAR	Wolverine	EEIS BLM/FS[4]	3.0	4.4	4.5	4.4	4.4	4.4	4.5	4.4	4.2
		EEIS CumEff[4]	4.0	4.6	5.0	5.0	5.0	4.9	5.0	4.9	4.4
		UCRB BLM/FS[4]	3.0	4.0	4.1	4.1	4.1	4.1	4.1	4.0	3.8
		UCRB CumEff[4]	4.0	5.0	5.0	4.9	5.0	4.9	5.0	4.9	4.3[5]
UNG	California bighorn sheep	EEIS BLM/FS[4]									
		EEIS CumEff[4]	3.5	4.7	4.7	4.6	4.7	4.7	4.6	4.7	4.9
		UCRB BLM/FS[4]	3.5	4.6	4.6	4.5	4.6	4.6	4.5	4.6	4.9
		UCRB CumEff[4]	3.5	4.7	4.7	4.6	4.7	4.7	4.6	4.7	4.9
UNG	Pronghorn	EEIS BLM/FS[4]	3.0	3.5	3.9	3.9	3.4	3.3	3.9	3.3	3.9
		EEIS CumEff[4]	3.0	4.1	4.3	4.3	4.3	4.3	4.3	4.3	4.3
		UCRB BLM/FS[4]	2.0	2.5	3.0[5]	3.0[5]	2.4	2.3	3.0[5]	2.3	3.0[5]
		UCRB CumEff[4]	2.0	3.4							
UNG	Woodland caribou	EEIS BLM/FS	4.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5
		EEIS CumEff	4.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.6
		UCRB BLM/FS	4.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5
		UCRB CumEff	4.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.6

[1]Group: CAR - carnivore; UNG - ungulate.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[4]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

[5]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table many be misleading.

Wolverine. Wolverines were historically widespread, but present in low densities in the assessment area. They were classified as predators and considered "vermin" or pests throughout much of their range until the 1960s (Banci 1994, Hornocker and Hash 1981). Copeland and Harris (1994) describe wolverines as nomadic in nature using a variety of habitats. Their preliminary data identify subalpine cirque habitats as important during reproduction. Wolverines are scavengers and depend on other large predators and natural mortality (winter kill, disease) for carrion. Refugia or large reserves that are capable of providing source populations combined with additional habitat suitable to support dispersing animals, may provide the best strategy for wolverine conservation (Banci 1994, Hornocker and Hash 1981).

Alternative 7 is predicted to provide the best wolverine habitat by establishing reserves with limited roads and human activity and requiring all existing unroaded areas greater than 1,000 acres to remain unroaded. These reserves have the potential to provide source populations from which individuals can disperse to other areas as habitat becomes available. The remaining alternatives would all provide outcomes similar to current conditions; habitat would remain isolated with little opportunity for female dispersal. Road management would be similar among Alternatives 2, 3, 4, 5, and 6, with overall open road densities predicted to remain stable or to decline, but with some currently unroaded areas proposed for roading. Alternative 1 would provide for continued increases in open road densities and loss of some current unroaded areas.

Gray wolf. Gray wolves use a wide variety of habitats (Fritts 1992, Fritts and others 1994, Gunson 1991, Martin and others 1995, Mech 1993, USDI 1987). Availability of prey (primarily large ungulates) and protection from direct mortality are considered important for wolf conservation and recovery (Fritts and others 1994, USDI 1987). Gray wolves were listed as endangered under the ESA in 1973. A recovery plan for the Northern Rocky Mountains (northwest Montana, central Idaho, and the greater Yellowstone area) was approved in 1987 (USDI 1987).

Habitat conditions for gray wolves were predicted to be similar for all alternatives. Wolf habitat under Alternatives 1, 3, and 5 is projected to decline slightly. Alternatives 2, 4, and 6 are projected to result in little change in habitat from current conditions. A slight increase in habitat was predicted under Alternative 7 as a result of retention of large unroaded areas and establishment of reserves. Because gray wolves are habitat generalists, all alternatives would provide adequate vegetation conditions, including habitat for prey populations. Cumulative effects from actions on other lands were predicted to be significant as a result of very high road densities, including high-volume interstate highways, and residential development in large river valleys which may be barriers to wolf movements.

Grizzly bear. Grizzly bears were listed as threatened under the ESA in 1975 and a recovery plan was approved in 1982 and revised in 1993 (USDI 1993). Six recovery zones were established for grizzly bears (USDI 1993). Three of the recovery zones, the Bitterroots, Selkirks, and Cabinet-Yaak, are completely within the assessment area and the remaining three, the Northern Continental Divide, Yellowstone, and North Cascades are partially within the area. Threats to grizzly bear persistence are more related to human activities in grizzly bear habitat than changes in vegetation composition and structure.

Alternative 7 is the only alternative predicted to improve conditions for grizzly bears on Federal lands. Establishment of reserves, retention of large unroaded areas, and management of natural disturbances within the reserves would provide the security habitat needed by bears and maintain desired foods, such as *Vaccinium* sp. Alternatives 1 through 6 would maintain or slightly improve on current conditions based on the existing recovery plan. Increased protection for riparian habitat in Alternatives 2, 3, 4, and 6 would benefit spring habitat conditions for bears. Except for Alternative 7, cumulative effects on lands other than federally administered are predicted to negatively influence grizzly bear populations. Human developments are predicted to expand in major river valleys, resulting in barriers to movement between bear populations.

Ungulates

Introduction—Twelve species of ungulates (including the feral horse) were identified and considered in the assessment. Three of these, woodland caribou, California bighorn sheep, and pronghorn, were selected for detailed analysis. Two species, woodland caribou and California bighorn sheep, are listed under the ESA or are listed as sensitive, and have suspected declines in population. Pronghorn were selected because of habitat declines from historic conditions and because habitat is predicted to continue to decline under one or more of the alternatives.

Methods—Outcomes projected by the expert panel were adjusted for pronghorn by the Science Team for similar reasons as with carnivores. Consultation with an additional species expert provided additional insight into historic, current, and projected outcomes for pronghorn. Outcomes for California bighorn sheep were adjusted to reflect disease as a part of cumulative effects rather than direct habitat effects (Hunt 1980, Jessup 1980, Jessup 1982).

Results—The alternatives would have very mixed effects on the ungulate species that were evaluated. Woodland caribou habitat on federally administered lands in the planning area would decline similarly under Alternatives 1 through 6 (tables 4.19 and 4.20). Habitat conditions would remain nearly unchanged, or improve very slightly, from current conditions under Alternative 7. Conversely, habitat for California bighorn sheep would be poorer under Alternative 7. Habitat for California bighorn sheep under Alternatives 1 through 6 would change little from current conditions. Habitat for pronghorn within the planning area would improve slightly from current conditions under Alternatives 3, 4, and 6. Pronghorn habitat would decline similarly under Alternative 1, 2, 5, and 7.

Outcomes for California bighorn sheep and woodland caribou were the same for both the EEIS and UCRB EIS areas. Outcomes for pronghorn were higher in the UCRB EIS area, but the alternatives were projected to have similar effects relative to the current condition.

Discussion—

Woodland caribou. Historically, the range of woodland caribou in the assessment area was limited to northwestern Montana and Idaho south to the Salmon River (USDI 1994). Current range in the assessment area is limited to approximately 2,200 square miles in the Selkirk Mountains in northeastern Washington and northern Idaho. Woodland caribou were listed as endangered under the ESA in 1983. A recovery plan was approved in 1985 and revised in 1994 (USDI 1994). Woodland caribou habitat varies seasonally, but appears to be associated with mature and late-seral conifer forests during early winter, spring (including calving), and fall. During late winter, high elevation, open-canopied vegetation containing high lichen densities is important (USDI 1994). Vegetation management, including timber harvest, has resulted in improved habitat for deer and elk. The increases in these ungulate populations has also resulted in predator (especially cougar) population increases in the range of woodland caribou. Predation has been identified as a potential problem in woodland caribou recovery (USDI 1994). Because existing late-seral habitat is limited, large fires have the potential to reduce the existing range of woodland caribou as do insects, disease, and timber harvesting activities (USDI 1994).

The woodland caribou recovery area is within a reserve that would be established under Alternative 7. Although a reserve area, this alternative would allow for restoration activities to protect short-term habitats necessary for threatened or endangered species such as caribou. Also control of large fires that could reduce habitat or restrict movement of woodland caribou may be necessary. Restoration of late-seral forests in Alternatives 3, 4, and 6 would improve woodland caribou habitat, but because the range and population are so small and isolated, extirpation is predicted without continued augmentation of the herd.

California bighorn sheep. Historically, California bighorn sheep were restricted to arid

canyons within the assessment area. Although patchily distributed (Outcomes 3 and 4), these populations were connected by movement of sheep across open habitats between canyons. Currently, encroachment of juniper and increased densities of sagebrush have reduced the amount of open areas, restricted sheep movement, and reduced the amount of habitat within canyons, thereby, resulting in isolated and smaller populations. Many of the existing populations have been reintroduced. Diseases transmitted by domestic livestock, primarily sheep, contribute to cumulative effects to California bighorn sheep that reduce population size and distribution.

Reintroductions and augmentation would be required to maintain populations under all alternatives. Restoration of native ranges using prescribed burning would improve habitat conditions by reducing the amount of juniper and the density of sagebrush, but the difference between alternatives is slight. It is also estimated that the spread of exotic vegetation would continue in all alternatives, but at a slower rate in Alternatives 4 and 6. Because of disease problems associated with domestic livestock, especially domestic sheep, cumulative effects on California bighorn sheep populations will remain high under all alternatives.

Pronghorn. Pronghorn populations in the assessment area have declined from historic levels during early human settlement. Construction of fences (impassable by pronghorn), roads, railroads, and the conversion of native ranges to agricultural crops have created barriers to pronghorn movement between ranges and have resulted in restricted use of available habitats. However, conditions were improved beginning in the 1950s when fences were modified on Federal lands to promote movement of pronghorn. Encroachment of woody vegetation, increases in the density of sagebrush and associated decline in native herbaceous vegetation, and increases in livestock grazing have contributed to declines in habitat on Federal lands.

Alternatives 1, 2, 5, and 7 would result in continued decline in pronghorn habitat as a result of continuation of current livestock grazing levels. Reserves would not be located in pronghorn range. Alternatives 3, 4, and 6 would promote active restoration of rangelands by prescribing higher levels of burning to reduce sagebrush and juniper densities and to promote increased forb growth. This would improve the quality and distribution of pronghorn habitat to near historic levels. Cumulative effects of highways, railroads, agricultural lands, and fences on non-Federal lands will continue to fragment landscapes and restrict movements of pronghorn.

Summary Effects by Alternative

Species Outcomes

Weighted mean outcomes for all plant and vertebrate species assessed in this study are displayed by alternative and planning area in figure 4.42. These summarized results are a reflection of the pattern of outcomes seen within most of the individual species groups reported above. Habitat for nearly all species was more favorable under historic conditions than currently. Further declines in habitat are projected under Alternatives 1 and 5, but overall mean outcomes would change little from current projections under the other alternatives. Alternatives 4 and 6 appear to be most favorable in overall mean outcome, but distinctions among Alternatives 2, 3, 4, 6, and 7 are difficult to detect in the overall means shown here.

Differences among the alternatives are more obvious in figure 4.43, which displays the number of species that fell into each outcome class by time period (historic, current, and future under each of the seven alternatives) and by planning area. One view of these differences would be to look at species that fall into Outcomes 1, 2, and 3 as contrasted to those that fall into Outcomes 4 and 5. The break between Outcomes 3 and 4 is important as Outcome 4 indicates conditions under which populations are largely isolated. On that basis, Alternative 1 is projected to clearly support the fewest species at the level of Outcomes 1, 2,

and 3, and Alternatives 4, 6, and 7 is projected to support the most species. Alternatives 2, 3, and 5 are intermediate. A comparison of the alternatives to current conditions reflects a conservative view of our ability to restore ecosystems that have been heavily modified from historic conditions. Even Alternatives 4, 6, and 7 which would have the most positive results, are projected to result in only moderate improvements over current conditions, especially in the UCRB planning area. Alternatives 1 and 5 are projected to result in declines from current. Compared on the basis of number of species that fall in Outcomes 1 and 2, none of the alternatives would allow habitat and populations to return to historic conditions.

Distinctions between the alternatives are further clarified in figure 4.44 which shows the number of species under each alternative and planning area that were projected to change > 0.5 in weighted mean outcome. There are few species for which habitat is projected to improve under Alternatives 1 and 2. A large number of species are projected to experience habitat decreases under Alternative 1. Under Alternative 5, habitat decreases are projected for more species than are habitat increases. Alternatives 3 and 7 display approximately equal numbers of increases and decreases, while only Alternatives 4 and 6 clearly show more species for which habitat is expected to increase than species for which decreases are expected.

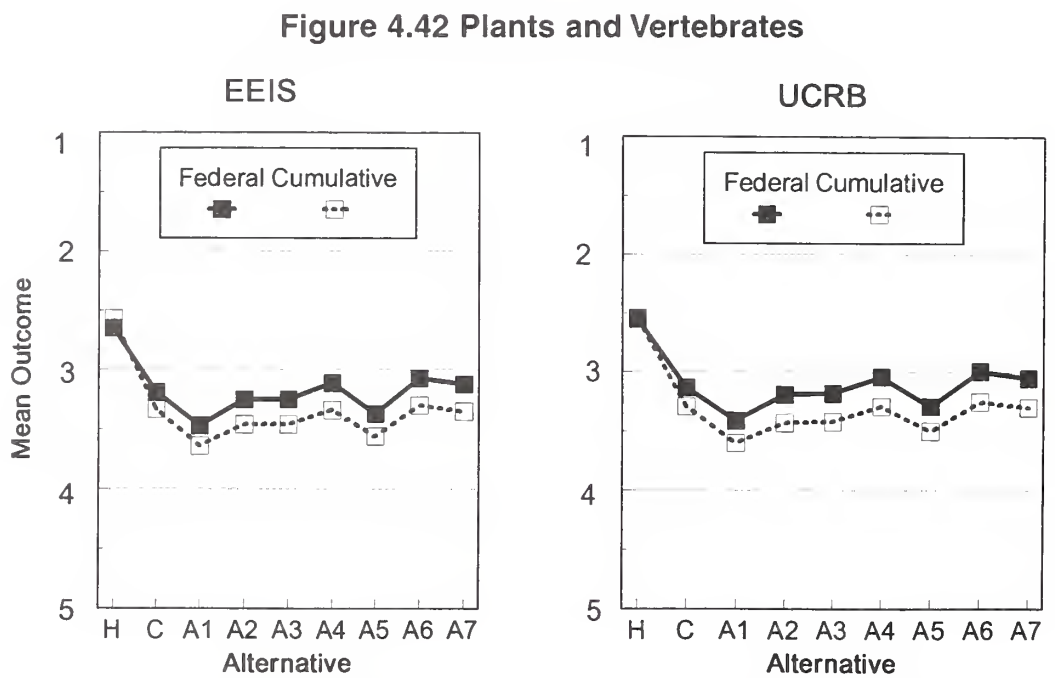

Figure 4.42. Mean outcome scores averaged over 141 (EEIS) and 132 (UCRB) species of plants and vertebrates in the planning areas for historic, current, and future scenarios under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

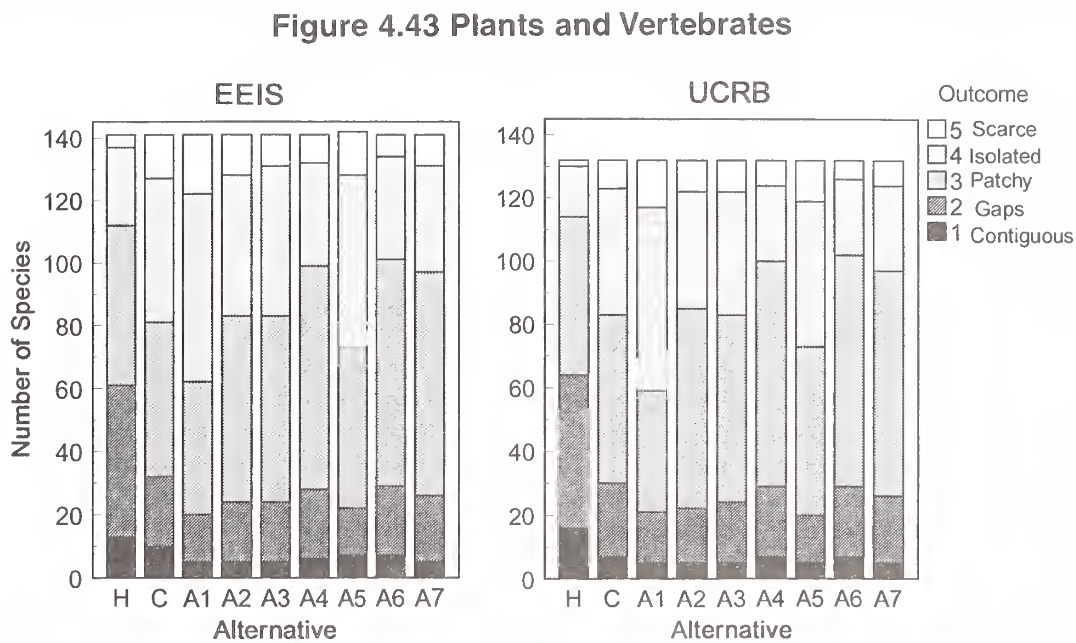

Figure 4.43. Frequency distribution of mean habitat outcome scores for 141 (EEIS) and 132 (UCRB) species of plants and vertebrates on Federal lands in the planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

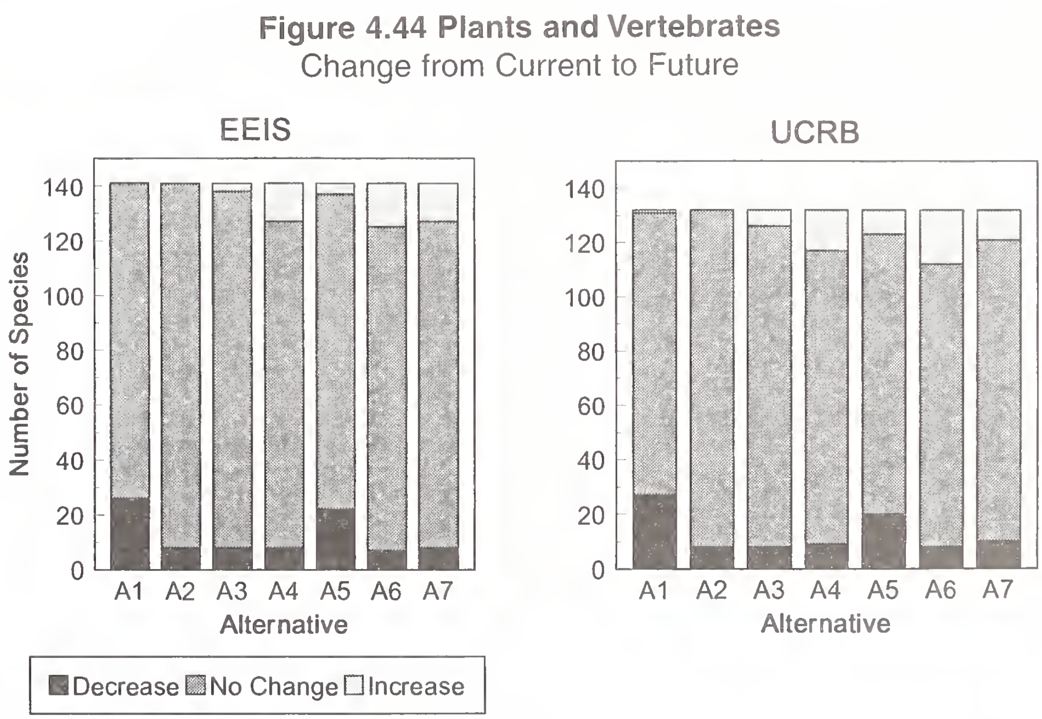

Figure 4.44. Departure of habitat outcomes on Federal lands from current conditions under each alternative for 141 (EEIS) and 132 (UCRB) species of plants and vertebrates on Federal lands in the planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

One important distinction among the alternatives is the number of species for which some likelihood of extirpation (Outcome 5) is projected. Figure 4.45 shows the number of species, by alternative and planning area, for which there were mean likelihoods of 10 points, 20 points, and 50 points attributed to Outcome 5 in the Federal habitat analysis. Three different levels of likelihood were used for this analysis because there is no single, critical threshold of concern, particularly when all taxa are combined in a single analysis. At all three levels of likelihood a similar pattern among alternatives emerges. The overall likelihood of extirpations has increased from historic to current conditions and is projected to continue increasing under Alternatives 1 and 5. Alternatives 4 and 6 are projected to result in small decreases in the likelihood of extirpation. Alternatives 2, 3 and 7 show intermediate results, although the effects of Alternative 7 are closer to those of Alternatives 4 and 6 than are those of Alternatives 2 and 3. None of the alternatives is projected to result in a return to the relatively low likelihoods of extirpation that were predicted for historic conditions.

Similarity of Alternatives

We used the weighted mean habitat outcomes for all plant and vertebrate species that were assessed to calculate average similarity among the time periods and alternatives (current conditions, historic conditions, projected future conditions under each of the seven alternatives). For this analysis, we computed matrices of Pearson correlation coefficients for habitat on Federal land on the two planning areas (table 4.21) and then used these matrices to compute a hierarchical cluster

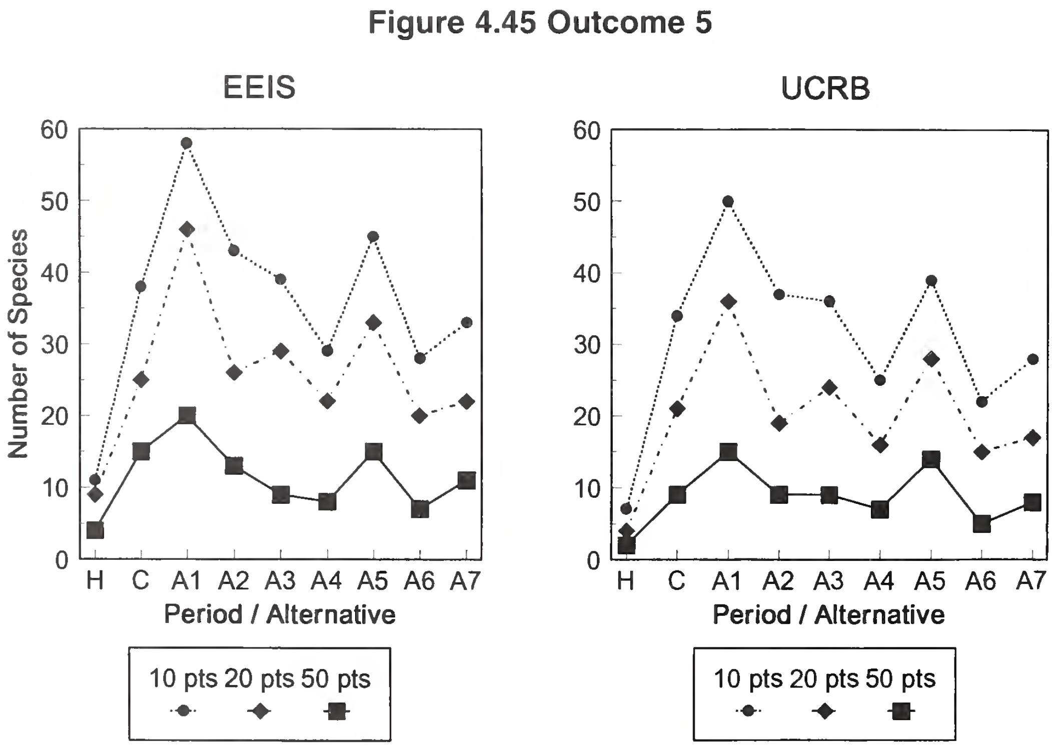

Figure 4.45. Numbers of species with likelihoods of 10, 20, and 50 points in Outcome 5 (habitat scarce, patchy and isolated with high risk of local population extirpation) under historic and current periods and under each preliminary draft EIS alternative in the EEIS and UCRB planning areas.

Table 4.21. Similarity matrix (Pearson correlation) based upon weighted mean outcomes for all species (plants and vertebrates) in the EEIS and UCRB planning areas.

Alternative	H	C	A1	A2	A3	A4	A5	A6
EEIS								
C	.7425							
A1	.5867	.8515						
A2	.6399	.8710	.9551					
A3	.6523	.8518	.9514	.9775				
A4	.6883	.8270	.9008	.9518	.9670			
A5	.6138	.8286	.9670	.9476	.9737	.9485		
A6	.7132	.8381	.8995	.9513	.9639	.9956	.9413	
A7	.6651	.8329	.9006	.9613	.9512	.9695	.9195	.9692
UCRB								
C	.6885							
A1	.5292	.8392						
A2	.5573	.8593	.9532					
A3	.5664	.8343	.9517	.9711				
A4	.6029	.8112	.9067	.9463	.9668			
A5	.5390	.8098	.9636	.9440	.9753	.9579		
A6	.6283	.8217	.9077	.9463	.9631	.9944	.9507	
A7	.5758	.8122	.9082	.9560	.9490	.9678	.9327	.9674

analysis using unweighted pair-group agglomeration. We then constructed dendrograms to display relationships among the scenarios (fig. 4.46).

This analysis shows similar clustering of alternatives in both planning areas. Alternatives 4, 6, and 7 formed one cluster, indicating that species were judged to respond more similarly to these three alternatives than to other alternatives (fig. 4.46). Alternatives 2 and 3 were closely correlated and clustered together, and Alternatives 1 and 5 were clustered. Further clustering of the alternative outcomes in the UCRB EIS first grouped Alternatives 1, 2, 3, and 5, then that cluster with Alternatives 4, 6, and 7. Current and historic outcomes were then linked at successively lower similarity levels. The pattern was slightly different in the EEIS area where Alternatives 2, 3, 4, 6, and 7 clustered next, then that cluster was joined with the cluster of Alternatives 1 and 5. The current and historic outcomes were then linked to the combination of all alternatives. It is further apparent from table 4.21 that historic outcomes are clearly dissimilar to current outcomes and from the alternatives.

Figure 4.46 Dendrograms

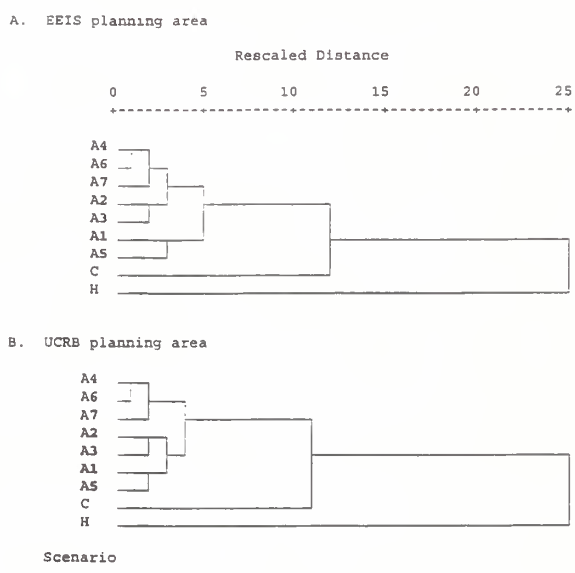

Figure 4.46. Dendrograms of similarity among time periods and alternatives, based upon mean outcomes for 141 (EEIS) and 132 (UCRB) species of vascular plants and vertebrates in the planning areas. Similarity was calculated from a matrix of Pearson correlation coefficients among all scenarios (see table 4.21). In these figures, vertical lines connect sets of more closely similar scenarios.

The linkage of Alternatives 4, 6, and 7 in both planning areas reflects the patterns of species response described in the results of this assessment. In most cases, species had higher average outcome scores in these alternatives than in others, reflecting likely improvement in distribution and abundance of habitat that is projected to occur under these alternatives. Similarly, the linkage of Alternatives 1 and 5 reflects correlated responses of species to reduced riparian buffer provisions of these alternatives and to effects of increased commodity production on species' habitat.

Uncertainty

The measure of uncertainty used throughout this report is the standard deviation of the frequency distribution of likelihoods among the outcome classes for each species. This measure incorporates variation among individual panelists as well as the spread of likelihood points among outcomes by each panelist. We calculated the standard deviation for each species and scenario and then averaged these values among species for each scenario. Uncertainty, assessed by this measure, ranged from about 0.48 outcome units in the historic scenario in both planning areas to about 0.58 in most alternatives in the UCRB EIS area (fig. 4.47). Uncertainty was lowest in the historic and current scenarios in both areas. Uncertainty varied among classes of organisms in our assessment and was highest for amphibians, lowest for plants, and intermediate for birds, mammals, and reptiles in the two planning areas (figs. 4.48 and 4.49).

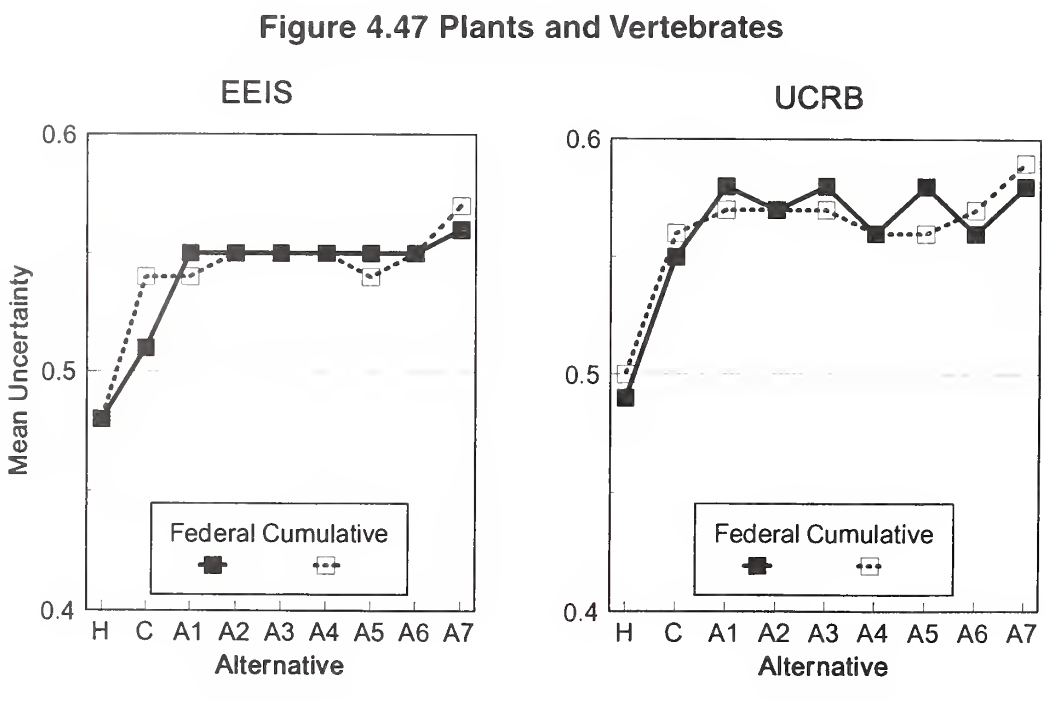

Figure 4.47. Mean indices of uncertainty associated with weighted mean outcomes for 141 (EEIS) and 132 (UCRB) species of vascular plants and vertebrates in the planning areas for historic, current, and future conditions under each alternative. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

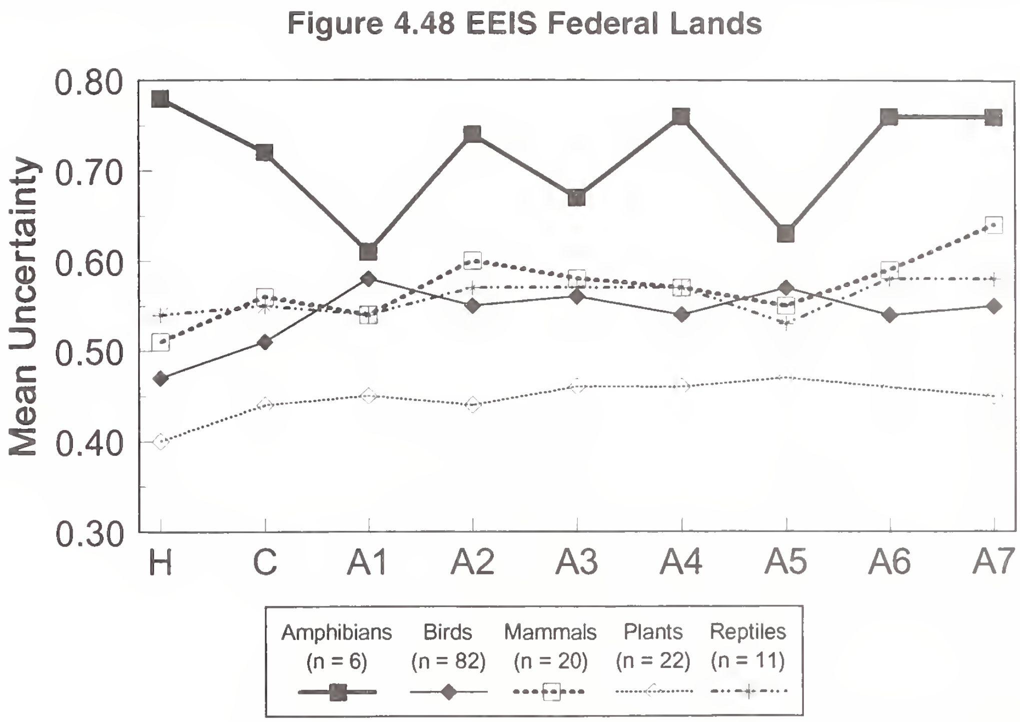

Figure 4.48. Variation in mean uncertainty in weighted mean outcomes for amphibians, reptiles, birds, mammals, and vascular plants in the EEIS planning area.

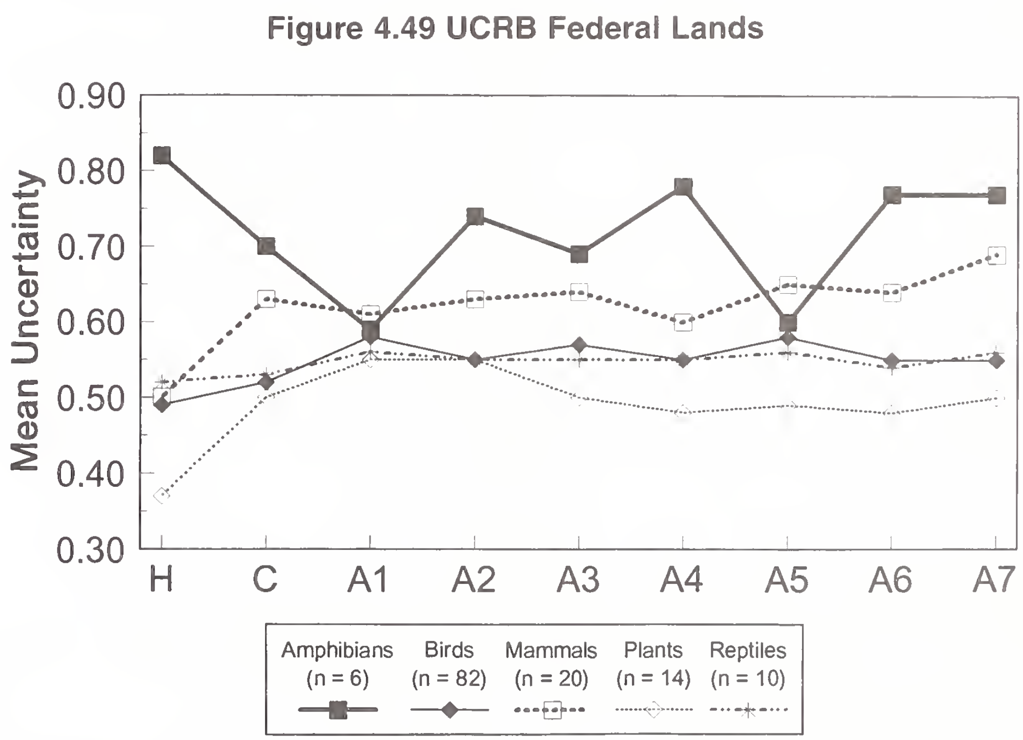

Figure 4.49. Variation in mean uncertainty in weighted mean habitat outcome scores for amphibians, reptiles, birds, mammals, and vascular plants in the UCRB planning area.

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Appendix 4-A

List of panel participants

Vascular Plants Panel

Lisa Croft, panel leader
Stephen Shelly, USDA Forest Service
Wayne Owen, USDA Forest Service

Amphibians and Reptiles Panel

Randy Hickenbottom, panel leader
Cay Ogden, scribe, USDI Fish and Wildlife Service
Charlotte Corkran, Portland, Oregon
Kenneth Kardong, Washington State University
Charles Peterson, Idaho State University

Waterbirds and Shorebirds Panel

John Lehmkuhl, panel leader
Cay Ogden, scribe, USDI Fish and Wildlife Service
Gary Ivey, USDI Fish and Wildlife Service
Matt Monda, Washington Department of Fish and Game
John Ratti, University of Idaho
Daniel Svingen, Nez Perce National Forest
Nils Warnock, University of Nevada, Reno

Raptors and Gamebirds Panel

Richard Holthausen, panel leader
Brad Thurber, scribe
Edward Garton, University of Idaho
John Marzluff, Sustainable Ecosystems Institute
Kerry Reese, University of Idaho
Richard Reynolds, USDA Forest Service
John Squires, USDA Forest Service

Cavity Nesting Birds Panel

Martin Raphael, panel leader
Paul Brewster, scribe, USDA Forest Service
Evelyn Bull, USDA Forest Service
James Sedgwick, National Biological Survey
Rita Dixon, University of Idaho
David Marshall, Portland, Oregon

Passerines and Other Birds Panel

Martin Raphael, panel leader
Katrina Martin, scribe, USDI Fish and Wildlife Service
Victoria Saab, USDA Forest Service
Christine Paige, Missoula, Montana
David Dobkin, High Desert Museum
Helen Ulmschneider, USDI Bureau of Land Management
Diane Evans, USDA Forest Service

Bats and Other Small Mammals Panel

Randy Hickenbottom, panel leader
Brad Thurber, scribe
James Hallett, Washington State University
Donna Howell, U.S. Department of the Army
Chris Maser, Corvallis, Oregon
Mark Perkins, Salt Lake City, Utah
Elizabeth Pierson, Berkeley, California

Carnivores and Ungulates Panel

Robert Naney, panel leader
Chris Loggers, scribe, USDA Forest Service
John Cook, National Council for Air and Stream Improvement
Thomas Hobbes, Colorado Division of Wildlife
Fred Lindsey, University of Wyoming
Paul Paquet, University of Alberta
Leonard Ruggiero, USDA Forest Service

Appendix 4-B

Vascular plant species considered for evaluation of management alternatives in the Interior Columbia River Basin assessment area.

Distribution & Scientific Name	Evaluation[1]
Locally Endemic:	
Abronia ammophila	Fine
Agrostis rossiae	Fine
Allium aaseae	Fine
Allium dictuon	Fine
Amsinckia carinata	Fine
Arabis suffrutescens var. *horizontalis*	Fine
Artemisia ludoviciana ssp. *estesii*	Fine
Astragalus applegatei	No
Astragalus atratus var. *inseptus*	Fine
Astragalus collinus var. *laurentii*	Fine
Astragalus columbianus	Fine
Astragalus diaphanus var. *diurnis*	Fine
Astragalus howellii	Fine
Astragalus sinuatus	Fine
Astragalus tyghensis	Fine
Astragalus vexilliflexus var. *nubilus*	Fine
Balsamorhiza rosea	Fine
Botrychium pumicola	Fine
Calochortus longebarbatus var. *peckii*	Yes
Calochortus macrocarpus var. *maculosus*	Fine
Camissonia pygmaea	Fine
Castilleja christii	Fine
Castilleja cryptantha	Fine
Castilleja pilosa var. *steenensis*	Fine
Castilleja rubida	Fine
Chrysothamnus parryi ssp. *montanus*	Fine
Claytonia umbellata	Fine
Cymopterus davisii	Fine
Delphinium viridescens	Fine
Draba trichocarpa	Fine
Erigeron basalticus	Fine
Erigeron lackschewitzii	Fine
Eriogonum chrysops	Fine
Eriogonum crosbyae	Fine
Eriogonum meledonum	Fine
Erythronium grandiflorum var. *nudipetalum*	Fine
Hackelia venusta	Fine
Haplopappus insecticruris	Fine
Ivesia rhypara var. *shellyi*	Fine
Lathyrus grimesii	Fine
Leptodactylon glabrum	Fine
Leptodactylon pungens ssp. *hazeliae*	Fine
Lesquerella carinata var. *languida*	Fine
Lesquerella humilis	Fine
Lomatium erythrocarpum	Fine
Lomatium greenmanii	Fine

Distribution & Scientific Name	Evaluation[1]
Lomatium sp. *nov. ("ochocoensis")*	Fine
Lomatium tuberosum	Fine
Luina serpentina	Fine
Lupinus cusickii	Fine
Mimulus hymenophyllus	Fine
Mimulus patulus	Fine
Mirabilis macfarlanei	Yes
Oenothera psammophila	Fine
Oxytropis campestris var. *wanapum*	Fine
Parnassia kotzebuei var. *pumila*	Fine
Penstemon idahoensis	Fine
Penstemon peckii	Fine
Perideridia erythrorhiza	Fine
Petrophytum cinerascens	Fine
Phacelia lenta	Fine
Phlox idahonis	Fine
Physaria didymocarpa var. *lyrata*	Fine
Primula alcalina	Fine
Ranunculus reconditus	Fine
Rubus bartonianus	Fine
Rubus nigerrimus	Fine
Saxifraga bryophora var. *tobiasiae*	Fine
Senecio ertterae	Fine
Sidalcea oregana var. *calva*	Fine
Silene seelyi	Fine
Sisyrinchium sarmentosum	Fine
Stephanomeria malheurensis	Yes
Tauschia hooveri	Fine
Thelypodium howellii ssp. *spectabilis*	Fine
Thelypodium repandum	Fine
Tofieldia glutinosa ssp. *absona*	Fine
Trifolium leibergii	Fine
Trifolium thompsonii	Yes
Regionally Endemic:	
Arabis falcifructa	Fine
Arabis fecunda	Fine
Artemisia campestris var. *wormskioldii*	Fine
Aster jessicae	No
Aster mollis	Fine
Astragalus anserinus	Fine
Astragalus cusickii var. sterilis	Fine
Astragalus diaphanus var. *diaphanus*	Fine
Astragalus mulfordiae	Yes
Astragalus oniciformis	Yes
Astragalus paysonii	Yes
Astragalus peckii	Fine
Astragalus scaphoides	Fine
Astragalus solitarius	Yes
Astragalus tegetarioides	Fine
Astragalus yoder-williamsii	Yes
Calochortus longebarbatus var. *longebarbatus*	Yes
Calochortus nitidus	Yes

Distribution & Scientific Name	Evaluation[1]
Carex parryana ssp. *idahoa*	Fine
Castilleja chlorotica	Yes
Chaenactis cusickii	Fine
Collomia mazama	Yes
Cymopterus douglassii	Fine
Descurainia torulosa	Fine
Douglasia idahoensis	Fine
Erigeron latus	Fine
Erigeron salmonensis	Fine
Eriogonum cusickii	Fine
Eriogonum lewisii	Fine
Eriogonum prociduum	Fine
Grindelia howellii	Yes
Hackelia cronquistii	Yes
Haplopappus liatriformis	Yes
Haplopappus radiatus	Fine
Iliamna longisepala	Fine
Ivesia rhypara var. *rhypara*	Fine
Lepidium davisii	Fine
Lepidium papilliferum	Fine
Lesquerella carinata var. *carinata*	No
Lesquerella paysonii	Fine
Lesquerella pulchella	No
Limnanthes floccosa var. *bellingeriana*	Fine
Lomatium suksdorfii	Yes
Lupinus biddlei	No
Mentzelia mollis	Fine
Mentzelia packardiae	Fine
Mimulus clivicola	Fine
Mimulus evanescens	Fine
Mimulus jungermannioides	Fine
Mimulus pygmaeus	Yes
Mimulus washingtonensis	Yes
Oryzopsis hendersonii	Fine
Oryzopsis wallensis	Fine
Oxytropis campestris var. *columbiana*	Fine
Papaver pygmaeum	Fine
Penstemon barrettiae	Fine
Penstemon compactus	Fine
Penstemon glaucinus	Yes
Penstemon lemhiensis	Yes
Physaria integrifolia var. *monticola*	Fine
Pleuropogon oregonus	Fine
Polemonium pectinatum	Yes
Potentilla cottamii	Fine
Silene spaldingii	Yes
Thelypodium eucosmum	Fine
Trifolium douglasii	Fine
Trifolium owyheense	Fine

Distribution & Scientific Name	Evaluation[1]
Scattered Distribution:	
Antennaria arcuata	Fine
Botrychium ascendens	Yes
Botrychium crenulatum	Yes
Botrychium paradoxum	Yes
Botrychium pedunculosum	Fine
Collomia renacta	Fine
Cymopterus nivalis	Fine
Cypripedium fasciculatum	Yes
Howellia aquatilis	Yes
Meconella oregana	Fine
Oryzopsis contracta	No
Phacelia inconspicua	Fine
Phacelia minutissima	Fine
Rorippa columbiae	Fine
Disjunct Distribution:	
Astragalus pulsiferae var. *suksdorfii*	Fine
Musineon lineare	Fine
Sullivantia hapemanii var. *hapemanii*	Fine
Peripheral to Columbia Basin:	
Carex lenticularis var. *dolia*	Fine

[1]Evaluation: "Yes" - alternative outcomes evaluated; "Fine" - recommended for fine-scale analysis by Forests or BLM units; "No" - no panel analysis done, and not recommended for fine-scale analysis.

Appendix 4-C

Vertebrate species occurring in the Interior Columbia River Basin assessment area, with designation for evaluation of management alternatives.

Common name	Scientific name	Evaluation[1]
Amphibians:		
Cascade torrent salamander	*Rhyacotriton cascadae*	no
Cope's giant salamander	*Dicamptodon copei*	no
Idaho giant salamander	*Dicamptodon aterrimus*	Fine
Long-toed salamander	*Ambystoma macrodactylum*	no
Northwestern salamander	*Ambystoma gracile*	no
Tiger salamander	*Ambystoma tigrinum*	no
Coeur d'Alene salamander	*Plethodon idahoensis*	HER
Dunn's salamander	*Plethodon dunni*	no
Ensatina	*Ensatina eschscholtzii*	no
Larch mountain salamander	*Plethodon larselli*	Fine
Oregon slender salamander	*Batrachoseps wrighti*	no
Rough-skin newt	*Taricha granulosa*	no
Western toad	*Bufo boreas*	HER
Woodhouse's toad	*Bufo woodhousii*	HER
Pacific chorus frog	*Pseudacris regilla*	no
Western chorus frog	*Pseudacris triseriata*	no
Tailed frog	*Ascaphus truei*	HER
Great basin spadefoot	*Spea intermontana*	no
Bullfrog	*Rana catesbeiana*	no
Cascades frog	*Rana cascadae*	no
Foothill yellow-legged frog	*Rana boylei*	no
Green frog	*Rana clamitans*	no
Northern leopard frog	*Rana pipiens*	HER
Red-legged frog	*Rana aurora*	no
Spotted frog species B	*Rana pretiosa* sp. B	HER
Spotted frog species A	*Rana pretiosa* sp. A	HER
Wood frog	*Rana sylvatica*	Fine
Birds:		
Common loon	*Gavia immer*	WAT
Pacific loon	*Gavia pacifica*	no
Red-throated loon	*Gavia stellata*	no
Yellow-billed loon	*Gavia adamsii*	no
Clark's grebe	*Aechmophorus clarkii*	WAT
Eared grebe	*Podiceps nigricollis*	no
Horned grebe	*Podiceps auritus*	no
Pied-billed grebe	*Podilymbus podiceps*	no
Red-necked grebe	*Podiceps grisegena*	WAT
Western grebe	*Aechmophorus occidentalis*	WAT
American white pelican	*Pelecanus erythrorhynchos*	WAT
Double-crested cormorant	*Phalacrocorax auritus*	no
American bittern	*Botaurus lentiginosus*	WAT
Black-crowned night heron	*Nycticorax nycticorax*	WAT
Cattle egret	*Bubulcus ibis*	no
Great blue heron	*Ardea herodias*	WAT
Great egret	*Casmerodius albus*	WAT

Common name	Scientific name	Evaluation[1]
Green heron	*Butorides virescens*	no
Snowy egret	*Egretta thula*	WAT
Western least bittern	*Ixobrychus exilis hesperis*	WAT
White-faced ibis	*Plegadis chihi*	WAT
American black duck	*Anas rubripes*	no
American wigeon	*Anas americana*	WAT
Barrow's goldeneye	*Bucephala islandica*	WAT
Black scoter	*Melanitta nigra*	no
Blue-winged teal	*Anas discors*	WAT
Brant	*Branta bernicla*	no
Bufflehead	*Bucephala albeola*	WAT
Canada goose	*Branta canadensis*	no
Canvasback	*Aythya valisineria*	WAT
Cinnamon teal	*Anas cyanoptera*	WAT
Common goldeneye	*Bucephala clangula*	WAT
Common merganser	*Mergus merganser*	WAT
Eurasian wigeon	*Anas penelope*	no
Gadwall	*Anas strepera*	WAT
Greater scaup	*Aythya marila*	no
Greater white-fronted goose	*Anser albifrons*	no
Green-winged teal	*Anas crecca*	WAT
Harlequin duck	*Histrionicus histrionicus*	WAT
Hooded merganser	*Lophodytes cucullatus*	WAT
Lesser scaup	*Aythya affinis*	WAT
Mallard	*Anas platyrhynchos*	WAT
Mute swan	*Cygnus olor*	no
Northern pintail	*Anas acuta*	WAT
Northern shoveler	*Anas clypeata*	WAT
Oldsquaw	*Clangula hyemalis*	no
Red-breasted merganser	*Mergus serrator*	no
Redhead	*Aythya americana*	WAT
Ring-necked duck	*Aythya collaris*	WAT
Ross' goose	*Chen rossii*	no
Ruddy duck	*Oxyura jamaicensis*	WAT
Snow goose	*Chen caerulescens*	no
Surf scoter	*Melanitta perspicillata*	no
Trumpeter swan	*Cygnus buccinator*	WAT
Tundra swan	*Cygnus columbianus*	no
White-winged scoter	*Melanitta fusca*	no
Wood duck	*Aix sponsa*	WAT
Turkey vulture	*Cathartes aura*	no
Bald eagle	*Haliaeetus leucocephalus*	RGB
Black-shouldered kite	*Elanus caeruleus*	no
Cooper's hawk	*Accipiter cooperii*	RGB
Ferruginous hawk	*Buteo regalis*	RGB
Golden eagle	*Aquila chrysaetos*	no
Northern goshawk	*Accipiter gentilis*	RGB
Northern harrier	*Circus cyaneus*	no
Osprey	*Pandion haliaetus*	no
Red-shouldered hawk	*Buteo lineatus*	no
Red-tailed hawk	*Buteo jamaicensis*	no
Rough-legged hawk	*Buteo lagopus*	no
Sharp-shinned hawk	*Accipiter striatus*	no
Swainson's hawk	*Buteo swainsoni*	RGB

Common name	Scientific name	Evaluation[1]
American kestrel	*Falco sparverius*	no
Gyrfalcon	*Falco rusticolus*	no
Merlin	*Falco columbarius*	RGB
Peregrine falcon	*Falco peregrinus*	no
Prairie falcon	*Falco mexicanus*	no
Blue grouse	*Dendragapus obscurus*	RGB
California quail	*Callipepla californica*	no
Chukar	*Alectoris chukar*	no
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	RGB
Gambel's quail	*Callipepla gambelii*	no
Gray partridge	*Perdix perdix*	no
Mountain quail	*Oreortyx pictus*	RGB
Northern bobwhite	*Colinus virginianus*	no
Ring-necked pheasant	*Phasianus colchicus*	no
Ruffed grouse	*Bonasa umbellus*	no
Sage grouse	*Centrocercus urophasianus*	RGB
Scaled quail	*Callipepla squamata*	no
Spruce grouse	*Dendragapus canadensis*	no
White-tailed ptarmigan	*Lagopus leucurus*	no
Wild turkey	*Meleagris gallopavo*	no
American coot	*Fulica americana*	no
Sora	*Porzana carolina*	WAT
Virginia rail	*Rallus limicola*	WAT
Yellow rail	*Coturnicops noveboracensis*	Fine
Greater sandhill crane	*Grus canadensis tabida*	WAT
Whooping crane	*Grus americana*	no
American golden-plover	*Pluvialis dominica*	no
Black-bellied plover	*Pluvialis squatarola*	WAT
Killdeer	*Charadrius vociferus*	no
Mountain plover	*Charadrius montanus*	no
Semipalmated plover	*Charadrius semipalmatus*	WAT
Western snowy plover	*Charadrius alexandrinus nivosus*	WAT
American avocet	*Recurvirostra americana*	WAT
Black-necked stilt	*Himantopus mexicanus*	WAT
Baird's sandpiper	*Calidris bairdii*	WAT
Common snipe	*Gallinago gallinago*	WAT
Dunlin	*Calidris alpina*	WAT
Greater yellowlegs	*Tringa melanoleuca*	WAT
Hudsonian godwit	*Limosa haemastica*	no
Least sandpiper	*Calidris minutilla*	WAT
Lesser yellowlegs	*Tringa flavipes*	WAT
Long-billed curlew	*Numenius americanus*	WAT
Long-billed dowitcher	*Limnodromus scolopaceus*	WAT
Marbled godwit	*Limosa fedoa*	WAT
Pectoral sandpiper	*Calidris melanotos*	WAT
Red knot	*Calidris canutus*	no
Red phalarope	*Phalaropus fulicaria*	no
Red-necked phalarope	*Phalaropus lobatus*	WAT
Sanderling	*Calidris alba*	WAT
Semipalmated sandpiper	*Calidris pusilla*	WAT
Short-billed dowitcher	*Limnodromus griseus*	no
Solitary sandpiper	*Tringa solitaria*	no
Spotted sandpiper	*Actitis macularia*	WAT
Stilt sandpiper	*Calidris himantopus*	no

Common name	Scientific name	Evaluation[1]
Upland sandpiper	*Bartramia longicauda*	WAT
Western sandpiper	*Calidris mauri*	WAT
Whimbrel	*Numenius phaeopus*	no
White-rumped sandpiper	*Calidris fuscicollis*	no
Willet	*Catoptrophorus semipalmatus*	WAT
Wilson's phalarope	*Phalaropus tricolor*	WAT
Black tern	*Chlidonias niger*	WAT
Bonaparte's gull	*Larus philadelphia*	no
California gull	*Larus californicus*	WAT
Caspian tern	*Sterna caspia*	Fine
Common tern	*Sterna hirundo*	no
Forster's tern	*Sterna forsteri*	WAT
Franklin's gull	*Larus pipixcan*	no
Glaucous gull	*Larus hyperboreus*	no
Glaucous-winged gull	*Larus glaucescens*	no
Herring gull	*Larus argentatus*	no
Long-tailed jaeger	*Stercorarius longicaudus*	no
Mew gull	*Larus canus*	no
Parasitic jeager	*Stercorarius parasiticus*	no
Ring-billed gull	*Larus delawarensis*	WAT
Sabine's gull	*Xema sabini*	no
Thayer's gull	*Larus thayeri*	no
Ancient murrelet	*Synthliboramphus antiquus*	no
Marbled murrelet	*Brachyramphus marmoratus*	no
Band-tailed pigeon	*Columba fasciata*	RGB
Mourning dove	*Zenaida macroura*	no
Rock dove	*Columba livia*	no
Black-billed cuckoo	*Coccyzus erythropthalmus*	no
Yellow-billed cuckoo	*Coccyzus americanus*	PAS
Common barn owl	*Tyto alba*	no
Barred owl	*Strix varia*	RGB
Boreal owl	*Aegolius funereus*	RGB
Burrowing owl	*Athene cunicularia*	RGB
Flammulated owl	*Otus flammeolus*	RGB
Great gray owl	*Strix nebulosa*	RGB
Great horned owl	*Bubo virginianus*	no
Long-eared owl	*Asio otus*	RGB
Northern hawk owl	*Surnia ulula*	no
Northern pygmy-owl	*Glaucidium gnoma*	RGB
Northern saw-whet owl	*Aegolius acadicus*	RGB
Northern spotted owl	*Strix occidentalis caurina*	RGB
Short-eared owl	*Asio flammeus*	no
Snowy owl	*Nyctea scandiaca*	no
Western screech owl	*Otus kennicottii*	RGB
Common nighthawk	*Chordeiles minor*	PAS
Common poorwill	*Phalaenoptilus nuttallii*	no
Whip-poor-will	*Caprimulgus vociferus*	no
Black swift	*Cypseloides niger*	no
Vaux's swift	*Chaetura vauxi*	CAV
White-throated swift	*Aeronautes saxatalis*	no
Anna's hummingbird	*Calypte anna*	no
Black-chinned hummingbird	*Archilochus alexandri*	PAS
Broad-tailed hummingbird	*Selasphorus platycercus*	PAS
Calliope hummingbird	*Stellula calliope*	no

Common name	Scientific name	Evaluation[1]
Costa's hummingbird	*Calypte costae*	no
Rufous hummingbird	*Selasphorus rufus*	PAS
Belted kingfisher	*Ceryle alcyon*	no
Black-backed woodpecker	*Picoides arcticus*	CAV
Downy woodpecker	*Picoides pubescens*	CAV
Hairy woodpecker	*Picoides villosus*	CAV
Lewis' woodpecker	*Melanerpes lewis*	CAV
Northern flicker	*Colaptes auratus*	no
Pileated woodpecker	*Dryocopus pileatus*	CAV
Red-breasted sapsucker	*Sphyrapicus ruber*	Fine
Red-headed woodpecker	*Melanerpes erythrocephalus*	no
Red-naped sapsucker	*Sphyrapicus nuchalis*	CAV
Three-toed woodpecker	*Picoides tridactylus*	CAV
White-headed woodpecker	*Picoides albolarvatus*	CAV
Williamson's sapsucker	*Sphyrapicus thyroideus*	CAV
Yellow-bellied sapsucker	*Sphyrapicus varius*	Fine
Acorn woodpecker	*Melanerpes formicivorus*	no
Alder flycatcher	*Empidonax alnorum*	no
Ash-throated flycatcher	*Myiarchus cinerascens*	PAS
Cordilleran flycatcher	*Empidonax occidentalis*	no
Dusky flycatcher	*Empidonax oberholseri*	no
Eastern kingbird	*Tyrannus tyrannus*	no
Gray flycatcher	*Empidonax wrightii*	no
Hammond's flycatcher	*Empidonax hammondii*	PAS
Least flycatcher	*Empidonax minimus*	Fine
Olive-sided flycatcher	*Contopus borealis*	PAS
Say's phoebe	*Sayornis saya*	no
Scissor-tailed flycatcher	*Tyrannus forficatus*	no
Western kingbird	*Tyrannus verticalis*	no
Western wood-pewee	*Contopus sordidulus*	no
Willow flycatcher	*Empidonax traillii*	PAS
Horned lark	*Eremophila alpestris*	PAS
Bank swallow	*Riparia riparia*	no
Barn swallow	*Hirundo rustica*	no
Cliff swallow	*Hirundo pyrrhonota*	no
Northern rough-winged swallow	*Stelgidopteryx serripennis*	no
Purple martin	*Progne subis*	no
Tree swallow	*Tachycineta bicolor*	no
Violet-green swallow	*Tachycineta thalassina*	no
American crow	*Corvus brachyrhynchos*	no
Black-billed magpie	*Pica pica*	no
Blue jay	*Cyanocitta cristata*	no
Clark's nutcracker	*Nucifraga columbiana*	no
Common raven	*Corvus corax*	no
Gray jay	*Perisoreus canadensis*	no
Pinyon jay	*Gymnorhinus cyanocephalus*	no
Scrub jay	*Aphelocoma coerulescens*	no
Steller's jay	*Cyanocitta stelleri*	no
Black-capped chickadee	*Parus atricapillus*	no
Boreal chickadee	*Parus hudsonicus*	no
Chestnut-backed chickadee	*Parus rufescens*	CAV
Mountain chickadee	*Parus gambeli*	no
Plain titmouse	*Parus inornatus*	no
Bushtit	*Psaltriparus minimus*	PAS

Common name	Scientific name	Evaluation[1]
Pygmy nuthatch	*Sitta pygmaea*	CAV
Red-breasted nuthatch	*Sitta canadensis*	no
White-breasted nuthatch	*Sitta carolinensis*	CAV
Brown creeper	*Certhia americana*	no
Bewick's wren	*Thryomanes bewickii*	no
Canyon wren	*Catherpes mexicanus*	no
House wren	*Troglodytes aedon*	no
Marsh wren	*Cistothorus palustris*	no
Rock wren	*Salpinctes obsoletus*	no
Winter wren	*Troglodytes troglodytes*	PAS
American dipper	*Cinclus mexicanus*	no
American robin	*Turdus migratorius*	no
Blue-gray gnatcatcher	*Polioptila caerulea*	no
Golden-crowned kinglet	*Regulus satrapa*	no
Hermit thrush	*Catharus guttatus*	no
Mountain bluebird	*Sialia currucoides*	no
Ruby-crowned kinglet	*Regulus calendula*	no
Swainson's thrush	*Catharus ustulatus*	no
Townsend's solitaire	*Myadestes townsendi*	no
Varied thrush	*Ixoreus naevius*	no
Veery	*Catharus fuscescens*	PAS
Western bluebird	*Sialia mexicana*	PAS
Wrentit	*Chamaea fasciata*	no
Brown thrasher	*Toxostoma rufum*	no
Gray catbird	*Dumetella carolinensis*	no
Northern mockingbird	*Mimus polyglottos*	no
Sage thrasher	*Oreoscoptes montanus*	PAS
American pipit	*Anthus rubescens*	no
Sprague's pipit	*Anthus spragueii*	no
Bohemian waxwing	*Bombycilla garrulus*	no
Cedar waxwing	*Bombycilla cedrorum*	no
Phainopepla	*Phainopepla nitens*	no
Loggerhead shrike	*Lanius ludovicianus*	PAS
Northern shrike	*Lanius excubitor*	no
European starling	*Sturnus vulgaris*	no
Red-eyed vireo	*Vireo olivaceus*	PAS
Solitary vireo	*Vireo solitarius*	no
Warbling vireo	*Vireo gilvus*	no
American redstart	*Setophaga ruticilla*	no
American tree sparrow	*Spizella arborea*	no
Baird's sparrow	*Ammodramus bairdii*	no
Bay-breasted warbler	*Dendroica castanea*	no
Black-and-white warbler	*Mniotilta varia*	no
Black-headed grosbeak	*Pheucticus melanocephalus*	no
Black-throated blue warbler	*Dendroica caerulescens*	no
Black-throated gray warbler	*Dendroica nigrescens*	no
Black-throated sparrow	*Amphispiza bilineata*	Fine
Blackburnian warbler	*Dendroica fusca*	no
Blackpoll warbler	*Dendroica striata*	no
Blue grosbeak	*Guiraca caerulea*	no
Bobolink	*Dolichonyx oryzivorus*	PAS
Brewer's blackbird	*Euphagus cyanocephalus*	PAS
Brewer's sparrow	*Spizella breweri*	PAS
Brown-headed cowbird	*Molothrus ater*	no

Common name	Scientific name	Evaluation[1]
California towhee	*Pipilo crissalis*	no
Chestnut-collared longspur	*Calcarius ornatus*	no
Chestnut-sided warbler	*Dendroica pensylvanica*	no
Chipping sparrow	*Spizella passerina*	PAS
Clay-colored sparrow	*Spizella pallida*	Fine
Common grackle	*Quiscalus quiscula*	no
Common yellowthroat	*Geothlypis trichas*	no
Dark-eyed junco	*Junco hyemalis*	no
Dickcissel	*Spiza americana*	no
Fox sparrow	*Passerella iliaca*	no
Golden-crowned sparrow	*Zonotrichia atricapilla*	no
Grasshopper sparrow	*Ammodramus savannarum*	PAS
Great-tailed grackle	*Quiscalus mexicanus*	no
Green-tailed towhee	*Pipilo chlorurus*	PAS
Harris' sparrow	*Zonotrichia querula*	no
Hermit warbler	*Dendroica occidentalis*	Fine
House sparrow	*Passer domesticus*	no
Indigo bunting	*Passerina cyanea*	no
Lapland longspur	*Calcarius lapponicus*	no
Lark bunting	*Calamospiza melanocorys*	no
Lark sparrow	*Chondestes grammacus*	PAS
Lazuli bunting	*Passerina amoena*	PAS
Le conte's sparrow	*Ammodramus leconteii*	no
Lincoln's sparrow	*Melospiza lincolnii*	no
Macgillivray's warbler	*Oporornis tolmiei*	no
Magnolia warbler	*Dendroica magnolia*	no
Mccown's longspur	*Calcarius mccownii*	no
Nashville warbler	*Vermivora ruficapilla*	no
Northern oriole	*Icterus galbula*	no
Northern parula	*Parula americana*	no
Northern waterthrush	*Seiurus noveboracensis*	no
Orange-crowned warbler	*Vermivora celata*	no
Ovenbird	*Seiurus aurocapillus*	no
Painted redstart	*Myioborus pictus*	no
Palm warbler	*Dendroica palmarum*	no
Red-winged blackbird	*Agelaius phoeniceus*	PAS
Rose-breasted grosbeak	*Pheucticus ludovicianus*	no
Rufous-sided towhee	*Pipilo erythrophthalmus*	PAS
Rusty blackbird	*Euphagus carolinus*	no
Sage sparrow	*Amphispiza belli*	PAS
Scarlet tanager	*Piranga olivacea*	no
Scott's oriole	*Icterus parisorum*	no
Snow bunting	*Plectrophenax nivalis*	no
Song sparrow	*Melospiza melodia*	no
Summer tanager	*Piranga rubra*	no
Swamp sparrow	*Melospiza georgiana*	no
Tennessee warbler	*Vermivora peregrina*	no
Townsend's warbler	*Dendroica townsendi*	no
Tricolored blackbird	*Agelaius tricolor*	Fine
Vesper sparrow	*Pooecetes gramineus*	PAS
Virginia's warbler	*Vermivora virginiae*	no
Western meadowlark	*Sturnella neglecta*	PAS
Western tanager	*Piranga ludoviciana*	PAS
White-crowned sparrow	*Zonotrichia leucophrys*	no

Common name	Scientific name	Evaluation[1]
White-throated sparrow	*Zonotrichia albicollis*	no
Wilson's warbler	*Wilsonia pusilla*	PAS
Yellow warbler	*Dendroica petechia*	PAS
Yellow-breasted chat	*Icteria virens*	PAS
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	no
Yellow-rumped warbler	*Dendroica coronata*	no
American goldfinch	*Carduelis tristis*	no
Black rosy finch	*Leucosticte atrata*	PAS
Cassin's finch	*Carpodacus cassinii*	no
Common redpoll	*Carduelis flammea*	no
Evening grosbeak	*Coccothraustes vespertinus*	no
Gray-crowned rosy finch	*Leucosticte tephrocotis*	no
Hoary redpoll	*Carduelis hornemanni*	no
House finch	*Carpodacus mexicanus*	no
Lesser goldfinch	*Carduelis psaltria*	no
Pine grosbeak	*Pinicola enucleator*	no
Pine siskin	*Carduelis pinus*	no
Purple finch	*Carpodacus purpureus*	no
Red crossbill	*Loxia curvirostra*	no
White-winged crossbill	*Loxia leucoptera*	PAS
Savannah sparrow	*Passerculus sandwichensis*	no
Mammals:		
Virginia opossum	*Didelphis virginiana*	no
Masked shrew	*Sorex cinereus*	no
Merriam's shrew	*Sorex merriami*	no
Montane shrew	*Sorex monticolus*	no
Preble's shrew	*Sorex preblei*	Fine
Pygmy shrew	*Sorex hoyi*	Fine
Trowbridge's shrew	*Sorex trowbridgii*	no
Vagrant shrew	*Sorex vagrans*	no
Water shrew	*Sorex palustris*	Fine
Broad-footed mole	*Scapanus latimanus*	Fine
Coast mole	*Scapanus orarius*	no
Shrew-mole	*Neurotrichus gibbsii*	Fine
Big brown bat	*Eptesicus fuscus*	no
California myotis	*Myotis californicus*	no
Fringed myotis	*Myotis thysanodes*	BSM
Hoary bat	*Lasiurus cinereus*	BSM
Little brown myotis	*Myotis lucifugus*	no
Long-eared myotis	*Myotis evotis*	BSM
Long-legged myotis	*Myotis volans*	BSM
Pale western big-eared bat	*Plecotus townsendii pallescens*	BSM
Pallid bat	*Antrozous pallidus*	no
Silver-haired bat	*Lasionycteris noctivagans*	BSM
Spotted bat	*Euderma maculatum*	BSM
Western pipistrelle	*Pipistrellus hesperus*	no
Western small-footed myotis	*Myotis ciliolabrum*	BSM
Yuma myotis	*Myotis yumanensis*	Fine
Brazilian free-tailed bat	*Tadarida brasiliensis*	Fine
American pika	*Ochotona princeps*	no
Black-tailed jackrabbit	*Lepus californicus*	no
Eastern cottontail	*Sylvilagus floridanus*	no
Mountain cottontail	*Sylvilagus nuttallii*	no

Common name	Scientific name	Evaluation[1]
Pygmy rabbit	*Brachylagus idahoensis*	BSM
Snowshoe hare	*Lepus americanus*	no
White-tailed jackrabbit	*Lepus townsendii*	BSM
Mountain beaver	*Aplodontia rufa*	Fine
Belding's ground squirrel	*Spermophilus beldingi*	no
California ground squirrel	*Spermophilus beecheyi*	no
Cascade golden-mantled ground squirrel	*Spermophilus saturatus*	no
Cliff chipmunk	*Tamias dorsalis*	Fine
Columbian ground squirrel	*Spermophilus columbianus*	no
Douglas' squirrel	*Tamiasciurus douglasii*	no
Eastern fox squirrel	*Sciurus niger*	no
Golden-mantled ground squirrel	*Spermophilus lateralis*	no
Hoary marmot	*Marmota caligata*	no
Idaho ground squirrel	*Spermophilus brunneus*	Fine
Least chipmunk	*Tamias minimus*	no
Northern flying squirrel	*Glaucomys sabrinus*	BSM
Red squirrel	*Tamiasciurus hudsonicus*	no
Red-tailed chipmunk	*Tamias ruficaudus*	no
Townsend's ground squirrel	*Spermophilus townsendii*	no
Uinta chipmunk	*Tamias umbrinus*	Fine
Uinta ground squirrel	*Spermophilus armatus*	Fine
Washington ground squirrel	*Spermophilus washingtoni*	Fine
Western gray squirrel	*Sciurus griseus*	Fine
White-tailed antelope squirrel	*Ammospermophilus leucurus*	Fine
Wyoming ground squirrel	*Spermophilus elegans nevadensis*	no
Yellow-bellied marmot	*Marmota flaviventris*	no
Yellow-pine chipmunk	*Tamias amoenus*	no
Botta's pocket gopher	*Thomomys bottae*	Fine
Brushprairie pocket gopher	*Thomomys talpoides douglasi*	Fine
Northern pocket gopher	*Thomomys talpoides*	no
Townsend's pocket gopher	*Thomomys townsendii*	no
Western pocket gopher	*Thomomys mazama*	no
White salmon pocket gopher	*Thomomys talpoides limosus*	Fine
California kangaroo rat	*Dipodomys californicus*	no
Chisel-toothed kangaroo rat	*Dipodomys microps*	no
Dark kangaroo mouse	*Microdipodops megacephalus*	no
Great basin pocket mouse	*Perognathus parvus*	no
Little pocket mouse	*Perognathus longimembris*	no
Ord's kangaroo rat	*Dipodomys ordii*	no
Beaver	*Castor canadensis*	no
Black rat	*Rattus rattus*	no
Bushy-tailed woodrat	*Neotoma cinerea*	no
Canyon mouse	*Peromyscus crinitus*	no
Columbian mouse	*Peromyscus keenii*	no
Common muskrat	*Ondatra zibethicus*	no
Creeping vole	*Microtus oregoni*	no
Deer mouse	*Peromyscus maniculatus*	no
Desert woodrat	*Neotoma lepida*	no
Dusky-footed woodrat	*Neotoma fuscipes*	Fine
Heather vole	*Phenacomys intermedius*	no
House mouse	*Mus musculus*	no
Long-tailed vole	*Microtus longicaudus*	no
Meadow vole	*Microtus pennsylvanicus*	no
Montane vole	*Microtus montanus*	no

Common name	Scientific name	Evaluation[1]
Northern bog lemming	*Synaptomys borealis*	Fine
Northern grasshopper mouse	*Onychomys leucogaster*	no
Norway rat	*Rattus norvegicus*	no
Pinyon mouse	*Peromyscus truei*	Fine
Potholes meadow vole	*Microtus pennsylvanicus kincaidi*	Fine
Sagebrush vole	*Lemmiscus curtatus*	no
Southern red-backed vole	*Clethrionomys gapperi*	no
Water vole	*Microtus richardsoni*	no
Western harvest mouse	*Reithrodontomys megalotis*	no
Western red-backed vole	*Clethrionomys californicus*	no
Pacific jumping mouse	*Zapus trinotatus*	Fine
Western jumping mouse	*Zapus princeps*	no
Common porcupine	*Erethizon dorsatum*	no
Nutria	*Myocastor coypus*	no
Common gray fox	*Urocyon cinereoargenteus*	Fine
Coyote	*Canis latrans*	no
Gray wolf	*Canis lupus*	C&U
Kit fox	*Vulpes velox*	Fine
Red fox	*Vulpes vulpes*	no
Black bear	*Ursus americanus*	no
Grizzly bear	*Ursus arctos*	C&U
Common raccoon	*Procyon lotor*	no
American badger	*Taxidea taxus*	no
American marten	*Martes americana*	C&U
Ermine	*Mustela erminea*	no
Fisher	*Martes pennanti*	C&U
Long-tailed weasel	*Mustela frenata*	no
Mink	*Mustela vison*	no
Northern river otter	*Lutra canadensis*	no
Striped skunk	*Mephitis mephitis*	no
Western spotted skunk	*Spilogale gracilis*	no
Wolverine	*Gulo gulo*	C&U
Bobcat	*Lynx rufus*	no
Lynx	*Lynx lynx*	C&U
Mountain lion	*Felis concolor*	no
Feral horse	*Equus caballus*	no
Black-tailed deer	*Odocoileus hemionus columbianus*	no
Moose	*Alces alces*	no
Mule deer	*Odocoileus hemionus*	no
Rocky mountain elk	*Cervus elaphus nelsonii*	no
White-tailed deer	*Odocoileus virginianus*	no
Woodland caribou	*Rangifer tarandus caribou*	C&U
Pronghorn	*Antilocapra americana*	C&U
American bison	*Bos bison*	no
California bighorn sheep	Ovis *canadensis californiana*	C&U
Mountain goat	*Oreamnos americanus*	no
Rocky mountain bighorn sheep	*Ovis canadensis canadensis*	no
Reptiles:		
Painted turtle	*Chrysemys picta*	HER
Western pond turtle	*Clemmys marmorata*	HER
Northern alligator lizard	*Elgaria coerulea*	no
Southern alligator lizard	*Elgaria multicarinata*	no
Desert horned lizard	*Phrynosoma platyrhinos*	HER

Common name	Scientific name	Evaluation[1]
Longnose leopard lizard	*Gambelia wislizenii*	HER
Mojave black-collared lizard	*Crotaphytus bicinctores*	HER
Sagebrush lizard	*Sceloporus graciosus graciosus*	HER
Short-horned lizard	*Phrynosoma douglassii*	HER
Side-blotched lizard	*Uta stansburiana*	no
Western fence lizard	*Sceloporus occidentalis*	no
Western skink	*Eumeces skiltonianus*	no
Plateau striped whiptail	*Cnemidophorus velox*	no
Western whiptail	*Cnemidophorus tigris*	no
Rubber boa	*Charina bottae*	HER
California mountain kingsnake	*Lampropeltis zonata*	Fine
Common garter snake	*Thamnophis sirtalis*	HER
Gopher snake	*Pituophis catenifer*	no
Ground snake	*Sonora semiannulata*	Fine
Longnose snake	*Rhinocheilus lecontei*	Fine
Night snake	*Hypsiglena torquata*	HER
Racer	*Coluber constrictor*	no
Ringneck snake	*Diadophis punctatus*	HER
Sharptail snake	*Contia tenuis*	HER
Striped whipsnake	*Masticophis taeniatus*	HER
Western terrestrial garter snake	*Thamnophis elegans*	no
Western rattlesnake	*Crotalus viridis*	no

[1]Evaluation: BSM - bat and small mammal panel; CAV - cavity nesting woodpeckers, swifts, and nuthatches; C&U - mammalian carnivore and ungulate panel; HER - amphibian and reptile panel; PAS - passerine and other birds; RGB - raptor and game bird panel; WAT - waterbird and shorebird panel; "Fine" - recommended for fine-scale analysis by Forests or BLM units; "no" - no panel analysis done, and not recommended for fine-scale analysis.

Appendix 4-D

Standard deviation of mean outcome of management alternatives for selected vascular plant and vertebrate species in the Interior Columbia River Basin assessment area. Mean outcomes were calculated as the mean of outcomes weighted by likelihood scores averaged across all panelists.

				Period / Alternative[4]								
Panel[1]	Group[2]	Species Name	Area[3]	H	C	A1	A2	A3	A4	A5	A6	A7
PLT	PLT	*Astragalus mulfordiae*	EEIS BLM/FS	0.40	0.49	0.60	0.67	0.67	0.67	0.67	0.67	0.67
			EEIS CumEff	0.40	0.67	0.60	0.67	0.67	0.67	0.75	0.67	0.67
			UCRB BLM/FS	0.40	0.46	0.60	0.67	0.67	0.67	0.67	0.67	0.67
			UCRB CumEff	0.40	0.49	0.64	0.75	0.75	0.74	0.75	0.74	0.75
PLT	PLT	*Astragalus oniciformis*	UCRB BLM/FS	0.30	0.49	0.75	0.75	0.59	0.67	0.59	0.67	0.67
			UCRB CumEff	0.30	0.49	0.59	0.59	0.67	0.67	0.67	0.67	0.67
PLT	PLT	*Astragalus paysonii*	UCRB BLM/FS	0.40	0.46	0.46	0.49	0.36	0.30	0.36	0.30	0.36
			UCRB CumEff	0.40	0.46	0.46	0.49	0.36	0.30	0.36	0.30	0.36
PLT	PLT	*Astragalus solitarius*	EEIS BLM/FS	0.40	0.46	0.46	0.46	0.46	0.40	0.46	0.40	0.46
			EEIS CumEff	0.40	0.46	0.46	0.46	0.46	0.40	0.46	0.40	0.46
PLT	PLT	*Astragalus yoder-williamsii*	UCRB BLM/FS	0.30	0.67	0.64	0.67	0.67	0.48	0.64	0.48	0.64
			UCRB CumEff	0.30	0.67	0.64	0.67	0.67	0.48	0.64	0.48	0.64
PLT	PLT	*Botrychium ascendens*	EEIS BLM/FS	0.50	0.50	0.40	0.40	0.46	0.46	0.46	0.46	0.40
			UCRB BLM/FS	0.50	0.50	0.49	0.49	0.46	0.49	0.46	0.49	0.46
			UCRB CumEff	0.50	0.50	0.49	0.49	0.49	0.49	0.49	0.49	0.49
PLT	PLT	*Botrychium crenulatum*	EEIS BLM/FS	0.50	0.50	0.83	0.67	0.67	0.75	0.75	0.75	0.67
			EEIS CumEff	0.50	0.50	0.83	0.67	0.67	0.75	0.75	0.75	0.67
			UCRB BLM/FS	0.49	0.49	0.67	0.75	0.75	0.75	0.67	0.75	0.75
			UCRB CumEff	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
PLT	PLT	*Botrychium paradoxum*	EEIS BLM/FS	0.50	0.50	0.49	0.49	0.49	0.49	0.49	0.49	0.49
			UCRB BLM/FS	0.50	0.50	0.49	0.49	0.49	0.49	0.49	0.49	0.49
PLT	PLT	*Calochortus longebartatus* var. *longebarbatus*	EEIS BLM/FS	0.40	0.46	0.50	0.48	0.48	0.49	0.50	0.49	0.48
			EEIS CumEff	0.40	0.48	0.50	0.49	0.49	0.50	0.50	0.50	0.49
PLT	PLT	*Calochortus longebarbatus* var. *peckii*	EEIS BLM/FS	0.00	0.40	0.40	0.30	0.30	0.40	0.46	0.40	0.30
			EEIS CumEff	0.00	0.44	0.40	0.30	0.30	0.40	0.46	0.40	0.30
PLT	PLT	*Calochortus nitidus*	EEIS BLM/FS	0.49	0.46	0.46	0.46	0.50	0.50	0.50	0.50	0.40
			EEIS CumEff	0.49	0.44	0.44	0.44	0.50	0.50	0.50	0.50	0.40
			UCRB BLM/FS	0.30	0.30	0.40	0.30	0.44	0.44	0.44	0.44	0.40
			UCRB CumEff	0.46	0.67	0.56	0.56	0.56	0.56	0.56	0.56	0.30
PLT	PLT	*Castilleja chlorotica*	EEIS BLM/FS	0.30	0.40	0.30	0.30	0.30	0.30	0.30	0.30	0.46
			EEIS CumEff	0.30	0.40	0.30	0.30	0.30	0.30	0.30	0.30	0.48

				Period / Alternative[4]								
Panel[1]	Group[2]	Species Name	Area[3]	H	C	A1	A2	A3	A4	A5	A6	A7
PLT	PLT	*Collomia mazama*	EEIS BLM/FS	0.30	0.30	0.30	0.30	0.40	0.30	0.40	0.30	0.30
			EEIS CumEff	0.30	0.30	0.30	0.30	0.40	0.30	0.40	0.30	0.30
PLT	PLT	*Cypripedium fasciculatum*	EEIS BLM/FS	0.46	0.60	0.60	0.60	0.45	0.45	0.45	0.45	0.46
			EEIS CumEff	0.46	0.70	0.70	0.70	0.66	0.66	0.66	0.66	0.66
			UCRB BLM/FS	0.46	0.64	0.67	0.67	0.36	0.30	0.36	0.30	0.40
			UCRB CumEff	0.49	0.67	0.67	0.64	0.67	0.48	0.67	0.48	0.36
PLT	PLT	*Grindelia howellii*	UCRB BLM/FS	0.00	0.50	0.49	0.44	0.40	0.46	0.40	0.46	0.46
			UCRB CumEff	0.49	0.49	0.36	0.36	0.36	0.36	0.36	0.36	0.36
PLT	PLT	*Hackelia cronquistii*	EEIS BLM/FS	0.50	0.49	0.60	0.56	0.54	0.59	0.56	0.66	0.66
			EEIS CumEff	0.50	0.46	0.46	0.46	0.46	0.49	0.46	0.48	0.49
PLT	PLT	*Haplopappus liatriformis*	UCRB BLM/FS	0.40	0.40	0.30	0.30	0.30	0.30	0.30	0.30	0.30
			UCRB CumEff	0.40	0.36	0.30	0.30	0.30	0.30	0.30	0.30	0.30
PLT	PLT	*Howellia aquatilis*	EEIS BLM/FS	0.40	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
			EEIS CumEff	0.49	0.80	0.80	0.80	0.78	0.78	0.78	0.78	0.78
			UCRB BLM/FS	0.30	0.48	0.51	0.51	0.51	0.51	0.51	0.51	0.48
			UCRB CumEff	0.30	0.48	0.64	0.64	0.64	0.64	0.64	0.64	0.48
PLT	PLT	*Lomatium suksdorfii*	EEIS BLM/FS	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.49	0.50	0.49	0.49	0.49	0.49	0.49	0.49	0.49
PLT	PLT	*Mimulus pygmaeus*	EEIS BLM/FS	0.30	0.40	0.40	0.36	0.40	0.36	0.40	0.36	0.40
			EEIS CumEff	0.30	0.40	0.40	0.36	0.40	0.36	0.40	0.36	0.40
PLT	PLT	*Mimulus washingtonensis* var. *washingtonensis*	EEIS BLM/FS	0.46	0.40	0.40	0.46	0.46	0.46	0.46	0.46	0.40
			EEIS CumEff	0.46	0.40	0.40	0.46	0.46	0.46	0.46	0.46	0.40
PLT	PLT	*Mirabilis macfarlanei*	EEIS BLM/FS	0.30	0.32	0.32	0.45	0.45	0.45	0.45	0.45	0.54
			EEIS CumEff	0.30	0.50	0.64	0.60	0.60	0.60	0.60	0.60	0.54
			UCRB BLM/FS	0.30	0.51	0.51	0.54	0.54	0.54	0.54	0.54	0.46
			UCRB CumEff	0.30	0.45	0.45	0.54	0.54	0.54	0.54	0.54	0.54
PLT	PLT	*Penstemon glaucinus*	EEIS BLM/FS	0.49	0.46	0.40	0.40	0.40	0.40	0.40	0.40	0.44
			EEIS CumEff	0.49	0.46	0.40	0.40	0.40	0.40	0.40	0.40	0.44
PLT	PLT	*Penstemon lemhiensis*	UCRB BLM/FS	0.46	0.64	0.64	0.64	0.40	0.30	0.40	0.30	0.49
			UCRB CumEff	0.46	0.60	0.60	0.60	0.46	0.40	0.46	0.40	0.49
PLT	PLT	*Polemonium pectinatum*	EEIS BLM/FS	0.49	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.40	0.30	0.22	0.22	0.22	0.22	0.22	0.22	0.22
PLT	PLT	*Silene spaldingii*	EEIS BLM/FS	0.50	0.50	0.50	0.50	0.64	0.64	0.64	0.64	0.50
			EEIS CumEff	0.40	0.40	0.30	0.30	0.30	0.30	0.30	0.30	0.30
PLT	PLT	*Stephanomeria malheurensis*	EEIS BLM/FS	0.00	0.0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
PLT	PLT	*Trifolium thompsonii*	EEIS BLM/FS	0.50	0.50	0.49	0.49	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
HER	AMP	Coeur d'Alene salamander	UCRB BLM/FS	0.64	0.68	0.50	0.54	0.46	0.51	0.50	0.51	0.50
			UCRB CumEff	0.64	0.54	0.36	0.42	0.42	0.45	0.36	0.47	0.56
HER	AMP	Northern leopard frog	EEIS BLM/FS	0.69	0.77	0.45	0.67	0.49	0.74	0.48	0.74	0.78
			EEIS CumEff	0.69	0.77	0.17	0.22	0.22	0.27	0.17	0.27	0.36
			UCRB BLM/FS	0.91	0.46	0.26	0.67	0.49	0.78	0.46	0.80	0.89
			UCRB CumEff	0.91	0.42	0.17	0.22	0.22	0.22	0.17	0.22	0.36
HER	AMP	Spotted frog species A	EEIS BLM/FS	0.67	0.67	0.70	0.74	0.67	0.73	0.71	0.77	0.77
			EEIS CumEff	0.67	0.67	0.70	0.72	0.72	0.72	0.71	0.72	0.67
HER	AMP	Spotted frog species B	EEIS BLM/FS	1.08	0.67	0.70	0.67	0.67	0.67	0.58	0.67	0.53
			EEIS CumEff	1.08	0.67	0.67	0.62	0.61	0.62	0.55	0.62	0.67
			UCRB BLM/FS	0.89	0.70	0.67	0.60	0.63	0.67	0.54	0.67	0.59
			UCRB CumEff	0.89	0.70	0.58	0.63	0.65	0.63	0.49	0.63	0.67
HER	AMP	Tailed frog	EEIS BLM/FS	0.93	0.91	0.43	0.91	0.86	0.94	0.64	0.94	0.94
			EEIS CumEff	0.93	0.91	0.44	0.62	0.65	0.65	0.67	0.65	0.62
			UCRB BLM/FS	0.88	0.94	0.72	0.88	0.88	0.88	0.73	0.90	0.88
			UCRB CumEff	0.88	0.94	0.88	0.68	0.72	0.78	0.86	0.78	0.72
HER	AMP	Western toad	EEIS BLM/FS	0.70	0.73	0.80	0.61	0.58	0.64	0.80	0.64	0.71
			EEIS CumEff	0.70	0.89	0.91	0.74	0.74	0.80	0.90	0.80	0.84
			UCRB BLM/FS	0.88	0.88	0.83	0.91	0.94	0.98	0.81	0.93	0.95
			UCRB CumEff	0.88	0.92	0.98	0.84	0.86	0.84	0.81	0.82	0.95
HER	AMP	Woodhouse's toad	EEIS BLM/FS	0.59	0.58	0.59	0.81	0.74	0.85	0.59	0.81	0.80
			EEIS CumEff	0.59	0.58	0.46	0.50	0.50	0.50	0.48	0.50	0.50
			UCRB BLM/FS	0.71	0.54	0.58	0.81	0.74	0.85	0.58	0.81	0.80
			UCRB CumEff	0.71	0.54	0.46	0.48	0.48	0.19	0.46	0.19	0.50
HER	REP	Common garter snake	EEIS BLM/FS	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.50	0.67	0.70	0.67	0.67	0.67	0.70	0.67	0.54
			UCRB CumEff	0.50	0.77	1.00	0.69	0.69	0.69	1.00	0.69	0.77
HER	REP	Desert horned lizard	EEIS BLM/FS	0.50	0.50	0.49	0.50	0.50	0.50	0.49	0.50	0.50
			EEIS CumEff	0.50	0.50	0.49	0.50	0.50	0.50	0.49	0.50	0.50
			UCRB BLM/FS	0.50	0.50	0.49	0.50	0.50	0.50	0.49	0.50	0.50
			UCRB CumEff	0.50	0.50	0.49	0.50	0.50	0.50	0.49	0.50	0.50
HER	REP	Longnose leopard lizard	EEIS BLM/FS	0.50	0.60	0.64	0.60	0.60	0.60	0.64	0.60	0.63
			EEIS CumEff	0.50	0.63	0.67	0.63	0.63	0.63	0.67	0.63	0.60
			UCRB BLM/FS	0.50	0.60	0.64	0.60	0.60	0.60	0.64	0.60	0.63
			UCRB CumEff	0.50	0.63	0.67	0.63	0.63	0.63	0.67	0.63	0.60
HER	REP	Mojave black-collared lizard	EEIS BLM/FS	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.50	0.60	0.64	0.60	0.60	0.60	0.64	0.60	0.63
			UCRB CumEff	0.88	0.75	0.75	0.63	0.63	0.63	0.75	0.63	0.60

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
HER	REP	Night snake	UCRB BLM/FS	0.50	0.50	0.49	0.50	0.50	0.50	0.49	0.50	0.50
			UCRB CumEff	0.50	0.49	0.48	0.49	0.49	0.49	0.48	0.49	0.50
HER	REP	Painted turtle	EEIS BLM/FS	0.59	0.58	0.68	0.77	0.77	0.59	0.68	0.59	0.59
			EEIS CumEff	0.59	0.77	0.95	1.03	1.03	0.75	0.91	0.75	0.73
			UCRB BLM/FS	0.50	0.48	0.58	0.66	0.70	0.49	0.58	0.43	0.50
			UCRB CumEff	0.50	0.73	0.91	0.97	0.87	0.62	0.91	0.72	0.65
HER	REP	Rubber boa	EEIS BLM/FS	0.50	0.50	0.30	0.50	0.50	0.64	0.30	0.64	0.70
			EEIS CumEff	0.50	0.50	0.30	0.50	0.50	0.64	0.30	0.64	0.70
			UCRB BLM/FS	0.71	0.36	0.44	0.36	0.36	0.48	0.44	0.48	0.68
			UCRB CumEff	0.71	0.50	0.72	0.67	0.67	0.67	0.72	0.67	0.51
HER	REP	Sagebrush lizard	EEIS BLM/FS	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.50	0.49	0.48	0.49	0.49	0.49	0.48	0.49	0.50
			UCRB CumEff	0.50	0.78	0.77	0.77	0.77	0.77	0.75	0.77	0.78
HER	REP	Sharptail snake	EEIS BLM/FS	0.50	0.50	0.46	0.59	0.59	0.66	0.49	0.75	0.70
			EEIS CumEff	0.50	0.50	0.00	0.30	0.30	0.30	0.00	0.30	0.50
HER	REP	Short-horned lizard	EEIS BLM/FS	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.50	0.49	0.46	0.49	0.49	0.49	0.46	0.49	0.50
			UCRB CumEff	0.50	0.48	0.46	0.48	0.48	0.48	0.46	0.48	0.50
HER	REP	Striped whipsnake	EEIS BLM/FS	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.50	0.63	0.66	0.63	0.63	0.63	0.66	0.63	0.64
			UCRB CumEff	0.50	0.63	0.66	0.60	0.60	0.60	0.66	0.60	0.63
HER	REP	Western pond turtle	EEIS BLM/FS	0.83	0.80	0.90	0.75	0.75	0.75	0.70	0.75	0.75
			EEIS CumEff	0.83	0.67	0.30	0.67	0.67	0.67	0.30	0.67	0.67
WAT	WAT	Group 1: Open water birds	EEIS BLM/FS	0.30	0.64	0.69	0.63	0.63	0.64	0.59	0.64	0.61
			EEIS CumEff	0.31	0.69	0.69	0.66	0.64	0.68	0.56	0.68	0.63
			UCRB BLM/FS	0.42	0.69	0.70	0.58	0.58	0.65	0.70	0.65	0.55
			UCRB CumEff	0.45	0.72	0.73	0.60	0.60	0.70	0.72	0.70	0.59
WAT	WAT	Group 2: Common loon	EEIS BLM/FS	0.44	0.49	0.61	0.57	0.57	0.58	0.57	0.58	0.57
			EEIS CumEff	0.61	0.73	0.81	0.73	0.72	0.72	0.73	0.72	0.73
			UCRB BLM/FS	0.39	0.50	0.64	0.58	0.58	0.58	0.58	0.58	0.58
			UCRB CumEff	0.49	0.74	0.89	0.74	0.74	0.74	0.74	0.74	0.74
WAT	WAT	Group 3: Wood duck, mergansers	EEIS BLM/FS	0.54	0.83	0.82	0.80	0.81	0.83	0.83	0.83	0.81
			EEIS CumEff	0.51	0.81	0.85	0.77	0.80	0.83	0.82	0.82	0.79
			UCRB BLM/FS	0.51	0.97	1.00	1.03	1.01	0.90	0.97	0.90	0.95
			UCRB CumEff	0.53	0.99	1.11	1.14	1.12	0.87	1.09	0.87	1.06
WAT	WAT	Group 4: Goldeneyes	EEIS BLM/FS	0.49	0.52	0.60	0.57	0.59	0.54	0.53	0.54	0.55
			EEIS CumEff	0.49	0.54	0.59	0.61	0.67	0.53	0.57	0.53	0.55
			UCRB BLM/FS	0.50	0.54	0.58	0.58	0.63	0.58	0.55	0.58	0.52
			UCRB CumEff	0.50	0.57	0.60	0.58	0.67	0.57	0.58	0.57	0.52

Panel[1]	Group[2]	Species Name	Area[3]	H	C	A1	A2	A3	A4	A5	A6	A7
				Period / Alternative[4]								
WAT	WAT	Group 5: Western snowy plover	EEIS BLM/FS	0.00	0	0.33	0.17	0.17	0.17	0.30	0.17	0.00
			EEIS CumEff	0.00	0.30	0.39	0.30	0.30	0.30	0.38	0.30	0.30
WAT	WAT	Group 6: Harlequin duck	EEIS BLM/FS	0.49	0.50	0.39	0.49	0.50	0.50	0.50	0.50	0.66
			EEIS CumEff	0.46	0.50	0.36	0.50	0.50	0.50	0.50	0.50	0.64
			UCRB BLM/FS	0.75	0.50	0.41	0.49	0.50	0.64	0.50	0.64	0.66
			UCRB CumEff	0.75	0.49	0.38	0.50	0.50	0.72	0.50	0.73	0.63
WAT	WAT	Group 7: Herons, egrets	EEIS BLM/FS	0.00	0.61	0.57	0.56	0.57	0.53	0.46	0.53	0.59
			EEIS CumEff	0.00	0.68	0.60	0.63	0.59	0.61	0.53	0.61	0.66
			UCRB BLM/FS	0.40	0.56	0.61	0.51	0.51	0.52	0.56	0.52	0.52
			UCRB CumEff	0.39	0.56	0.61	0.52	0.52	0.56	0.57	0.56	0.53
WAT	WAT	Group 8: Dabbling ducks	EEIS BLM/FS	0.46	0.67	0.71	0.62	0.61	0.52	0.64	0.52	0.58
			EEIS CumEff	0.50	0.69	0.75	0.64	0.62	0.58	0.65	0.58	0.58
			UCRB BLM/FS	0.42	0.57	0.64	0.56	0.53	0.58	0.56	0.58	0.56
			UCRB CumEff	0.44	0.66	0.72	0.61	0.61	0.58	0.65	0.58	0.60
WAT	WAT	Group 9: Spotted sandpiper	EEIS BLM/FS	0.50	0.50	0.60	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.50	0.61	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.50	0.50	0.60	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB CumEff	0.50	0.50	0.61	0.50	0.50	0.49	0.50	0.49	0.49
WAT	WAT	Group 10: Greater sandhill crane	EEIS BLM/FS	0.44	0.50	0.49	0.36	0.36	0.38	0.50	0.38	0.50
			EEIS CumEff	0.35	0.55	0.59	0.55	0.55	0.51	0.43	0.51	0.43
			UCRB BLM/FS	0.52	0.60	0.56	0.57	0.57	0.47	0.58	0.47	0.47
			UCRB CumEff	0.54	0.44	0.44	0.56	0.56	0.44	0.45	0.44	0.57
WAT	WAT	Group 11: Rails, avocets	EEIS BLM/FS	0.46	0.50	0.63	0.54	0.54	0.48	0.54	0.48	0.54
			EEIS CumEff	0.57	0.53	0.66	0.57	0.57	0.49	0.58	0.50	0.58
			UCRB BLM/FS	0.49	0.50	0.60	0.52	0.52	0.49	0.52	0.49	0.52
			UCRB CumEff	0.53	0.54	0.64	0.56	0.56	0.50	0.56	0.50	0.56
WAT	WAT	Group 12: Curlew, willet	EEIS BLM/FS	0.25	0.30	0.25	0.34	0.34	0.41	0.29	0.41	0.34
			EEIS CumEff	0.29	0.35	0.28	0.37	0.37	0.43	0.34	0.43	0.39
			UCRB BLM/FS	0.25	0.30	0.25	0.34	0.34	0.02	0.29	0.02	0.34
			UCRB CumEff	0.29	0.35	0.28	0.37	0.37	0.43	0.34	0.43	0.39
WAT	WAT	Group 13: Upland sandpiper	EEIS BLM/FS	0.49	0.00	0.00	0.14	0.30	0.44	0.30	0.44	0.36
			EEIS CumEff	0.50	0.00	0.00	0.14	0.14	0.33	0.00	0.33	0.14
			UCRB BLM/FS	0.48	0.00	0.00	0.14	0.30	0.44	0.30	0.44	0.36
			UCRB CumEff	0.48	0.00	0.00	0.14	0.14	0.33	0.00	0.33	0.14
WAT	WAT	Group 14: Common snipe	EEIS BLM/FS	0.49	0.56	0.66	0.64	0.64	0.57	0.63	0.58	0.61
			EEIS CumEff	0.48	0.58	0.67	0.65	0.65	0.57	0.65	0.58	0.61
			UCRB BLM/FS	0.49	0.56	0.66	0.60	0.60	0.57	0.59	0.58	0.61
			UCRB CumEff	0.48	0.58	0.67	0.65	0.65	0.57	0.65	0.58	0.61

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
WAT	WAT	Group 15: Migrant sandpipers	EEIS BLM/FS	0.68	0.70	0.73	0.72	0.72	0.72	0.69	0.72	0.72
			EEIS CumEff	0.68	0.69	0.72	0.69	0.69	0.69	0.69	0.69	0.69
			UCRB BLM/FS	0.65	0.62	0.61	0.62	0.62	0.68	0.58	0.68	0.62
			UCRB CumEff	0.67	0.67	0.68	0.67	0.67	0.66	0.65	0.66	0.66
RGB	GMB	Band-tailed pigeon	EEIS BLM/FS	0.89	0.92	0.80	0.82	0.99	0.96	0.97	1.00	0.84
			EEIS CumEff	0.90	0.91	0.79	0.78	1.01	1.00	0.97	1.01	0.83
			UCRB BLM/FS	0.77	0.87	0.78	0.74	0.86	0.87	0.83	0.87	0.97
			UCRB CumEff	0.77	0.83	0.76	0.72	0.90	0.89	0.90	0.89	0.90
RGB	GMB	Blue grouse	EEIS BLM/FS	0.70	0.69	0.79	0.79	0.66	0.66	0.66	0.66	0.63
			EEIS CumEff	0.70	0.69	0.82	0.81	0.66	0.66	0.66	0.66	0.64
			UCRB BLM/FS	0.54	0.68	0.81	0.81	0.67	0.67	0.67	0.67	0.66
			UCRB CumEff	0.50	0.68	0.72	0.72	0.66	0.66	0.67	0.65	0.64
RGB	GMB	Columbian sharp-tailed grouse	EEIS BLM/FS	0.44	0.47	0.52	0.52	0.75	0.70	0.73	0.70	0.69
			EEIS CumEff	0.43	0.52	0.54	0.53	0.80	0.77	0.78	0.78	0.80
			UCRB BLM/FS	0.49	0.52	0.53	0.53	0.72	0.69	0.70	0.71	0.69
			UCRB CumEff	0.48	0.53	0.54	0.54	0.74	0.73	0.73	0.75	0.76
RGB	GMB	Mountain quail	EEIS BLM/FS	0.76	0.71	0.73	0.72	0.70	0.75	0.68	0.74	0.80
			EEIS CumEff	0.60	0.61	0.59	0.59	0.54	0.50	0.55	0.50	0.54
			UCRB BLM/FS	0.92	0.39	0.48	0.50	0.64	0.70	0.61	0.70	0.64
			UCRB CumEff	0.85	0.48	0.52	0.54	0.64	0.68	0.63	0.67	0.64
RGB	GMB	Sage grouse	EEIS BLM/FS	0.56	0.75	0.70	0.73	0.91	0.77	0.86	0.80	0.74
			EEIS CumEff	0.56	0.79	0.72	0.72	0.81	0.73	0.76	0.76	0.73
			UCRB BLM/FS	0.57	0.70	0.68	0.73	0.95	0.81	0.91	0.82	0.76
			UCRB CumEff	0.56	0.73	0.68	0.73	0.73	0.74	0.72	0.75	0.72
RGB	RAP	Bald eagle	EEIS BLM/FS	0.59	0.76	0.77	0.61	0.57	0.54	0.55	0.54	0.55
			EEIS CumEff	0.60	0.68	0.78	0.64	0.60	0.57	0.59	0.58	0.58
			UCRB BLM/FS	0.59	0.76	0.77	0.61	0.57	0.54	0.55	0.54	0.55
			UCRB CumEff	0.60	0.68	0.78	0.64	0.60	0.57	0.59	0.58	0.58
RGB	RAP	Barred owl	EEIS BLM/FS	0.87	0.61	0.78	0.81	0.74	0.78	0.75	0.74	0.68
			EEIS CumEff	0.54	0.59	0.81	0.77	0.85	0.88	0.85	0.87	0.70
			UCRB BLM/FS	0.70	0.82	0.72	0.78	0.77	0.76	0.63	0.76	0.64
			UCRB CumEff	0.35	0.96	0.76	0.78	0.83	0.81	0.83	0.79	0.77
RGB	RAP	Boreal owl	EEIS BLM/FS	0.95	0.74	0.80	0.79	0.84	0.85	0.84	0.85	0.89
			EEIS CumEff	0.76	0.79	0.81	0.80	0.81	0.81	0.82	0.81	0.90
			UCRB BLM/FS	0.87	0.95	0.94	0.93	0.92	0.93	0.92	0.88	0.85
			UCRB CumEff	0.92	0.94	0.92	0.90	0.79	0.79	0.81	0.76	0.76
RGB	RAP	Burrowing owl	EEIS BLM/FS	0.61	0.84	0.83	0.83	0.73	0.73	0.74	0.74	0.73
			EEIS CumEff	0.55	0.73	0.76	0.76	0.72	0.71	0.73	0.71	0.75
			UCRB BLM/FS	0.61	0.85	0.88	0.89	0.72	0.72	0.73	0.73	0.73
			UCRB CumEff	0.57	0.74	0.74	0.75	0.70	0.69	0.71	0.69	0.73
RGB	RAP	Cooper's hawk	EEIS BLM/FS	0.73	0.75	0.76	0.75	0.81	0.70	0.81	0.70	0.82
			EEIS CumEff	0.64	0.74	0.78	0.76	0.73	0.63	0.73	0.63	0.73
			UCRB BLM/FS	0.73	0.76	0.79	0.79	0.82	0.70	0.82	0.70	0.82
			UCRB CumEff	0.64	0.72	0.76	0.75	0.72	0.61	0.72	0.61	0.71

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
RGB	RAP	Ferruginous hawk	EEIS BLM/FS	0.50	0.71	0.70	0.76	0.57	0.54	0.57	0.54	0.57
			EEIS CumEff	0.52	0.53	0.50	0.51	0.49	0.50	0.49	0.50	0.50
			UCRB BLM/FS	0.51	0.70	0.69	0.75	0.56	0.54	0.57	0.54	0.56
			UCRB CumEff	0.52	0.53	0.50	0.51	0.49	0.50	0.49	0.50	0.50
RGB	RAP	Flammulated owl	EEIS BLM/FS	0.49	0.79	0.78	0.81	0.75	0.65	0.74	0.67	0.81
			EEIS CumEff	0.49	0.79	0.78	0.79	0.74	0.64	0.74	0.67	0.80
			UCRB BLM/FS	0.49	0.79	0.78	0.81	0.75	0.65	0.74	0.67	0.81
			UCRB CumEff	0.49	0.79	0.78	0.81	0.75	0.65	0.74	0.67	0.81
RGB	RAP	Great gray owl	EEIS BLM/FS	0.75	0.84	0.76	0.83	0.64	0.61	0.66	0.61	0.80
			EEIS CumEff	0.77	0.89	0.86	0.84	0.73	0.69	0.74	0.69	0.88
			UCRB BLM/FS	0.67	0.76	0.82	0.84	0.75	0.67	0.69	0.67	0.79
			UCRB CumEff	0.74	0.77	0.87	0.86	0.77	0.70	0.72	0.70	0.82
RGB	RAP	Long-eared owl	EEIS BLM/FS	0.78	0.73	0.73	0.73	0.71	0.81	0.79	0.81	0.80
			EEIS CumEff	0.78	0.77	0.81	0.73	0.70	0.62	0.70	0.62	0.74
			UCRB BLM/FS	0.78	0.70	0.69	0.77	0.75	0.71	0.75	0.77	0.64
			UCRB CumEff	0.74	0.65	0.76	0.74	0.67	0.69	0.56	0.74	0.64
RGB	RAP	Merlin	EEIS BLM/FS	0.70	0.75	0.76	0.77	0.74	0.70	0.73	0.70	0.74
			EEIS CumEff	0.66	0.73	0.74	0.74	0.74	0.70	0.72	0.70	0.74
			UCRB BLM/FS	0.69	0.69	0.71	0.71	0.69	0.69	0.67	0.69	0.66
			UCRB CumEff	0.66	0.71	0.69	0.69	0.69	0.69	0.68	0.69	0.67
RGB	RAP	Northern goshawk	EEIS BLM/FS	0.67	0.80	0.80	0.77	0.78	0.81	0.77	0.79	0.79
			EEIS CumEff	0.67	0.76	0.74	0.72	0.76	0.81	0.73	0.74	0.74
			UCRB BLM/FS	0.66	0.87	0.71	0.68	0.69	0.75	0.67	0.73	0.66
			UCRB CumEff	0.69	0.86	0.70	0.69	0.69	0.76	0.68	0.75	0.72
RGB	RAP	Northern pygmy-owl	EEIS BLM/FS	0.48	0.55	0.56	0.53	0.54	0.52	0.54	0.52	0.56
			EEIS CumEff	0.48	0.53	0.55	0.52	0.52	0.49	0.52	0.49	0.52
			UCRB BLM/FS	0.45	0.57	0.54	0.54	0.54	0.51	0.54	0.51	0.56
			UCRB CumEff	0.46	0.54	0.53	0.52	0.52	0.47	0.52	0.47	0.52
RGB	RAP	Northern saw-whet owl	EEIS BLM/FS	0.51	0.59	0.61	0.60	0.67	0.61	0.67	0.59	0.62
			EEIS CumEff	0.49	0.58	0.59	0.57	0.64	0.58	0.64	0.53	0.59
			UCRB BLM/FS	0.45	0.60	0.59	0.60	0.64	0.58	0.64	0.55	0.62
			UCRB CumEff	0.43	0.59	0.56	0.58	0.61	0.54	0.61	0.48	0.59
RGB	RAP	Swainson's hawk	EEIS BLM/FS	0.73	0.69	0.67	0.67	0.67	0.66	0.67	0.65	0.65
			EEIS CumEff	0.73	0.74	0.73	0.73	0.71	0.68	0.71	0.65	0.69
			UCRB BLM/FS	0.77	0.69	0.67	0.67	0.67	0.66	0.67	0.65	0.65
			UCRB CumEff	0.77	0.74	0.73	0.73	0.71	0.68	0.71	0.65	0.69
RGB	RAP	Western screech owl	EEIS BLM/FS	0.50	0.61	0.57	0.58	0.58	0.52	0.58	0.50	0.50
			EEIS CumEff	0.49	0.62	0.57	0.58	0.57	0.50	0.56	0.50	0.50
			UCRB BLM/FS	0.50	0.61	0.57	0.58	0.58	0.52	0.58	0.50	0.50
			UCRB CumEff	0.49	0.63	0.59	0.58	0.57	0.50	0.56	0.50	0.50
CAV	CAV	Black-backed woodpecker	EEIS BLM/FS	0.40	0.26	0.51	0.45	0.50	0.44	0.56	0.44	0.44
			EEIS CumEff	0.40	0.40	0.66	0.54	0.58	0.46	0.59	0.46	0.44
			UCRB BLM/FS	0.40	0.44	0.73	0.55	0.58	0.48	0.54	0.58	0.41
			UCRB CumEff	0.40	0.40	0.63	0.44	0.44	0.48	0.58	0.59	0.55

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
CAV	CAV	Downy woodpecker	EEIS BLM/FS	0.44	0.46	0.54	0.41	0.36	0.39	0.51	0.42	0.36
			EEIS CumEff	0.44	0.44	0.50	0.33	0.33	0.39	0.55	0.36	0.38
			UCRB BLM/FS	0.44	0.39	0.34	0.45	0.51	0.39	0.58	0.42	0.35
			UCRB CumEff	0.44	0.46	0.30	0.45	0.51	0.39	0.54	0.36	0.35
CAV	CAV	Hairy woodpecker	EEIS BLM/FS	0.26	0.40	0.50	0.48	0.44	0.44	0.43	0.49	0.40
			EEIS CumEff	0.36	0.31	0.43	0.44	0.44	0.49	0.43	0.49	0.46
			UCRB BLM/FS	0.26	0.36	0.50	0.48	0.50	0.49	0.50	0.48	0.32
			UCRB CumEff	0.26	0.36	0.50	0.50	0.49	0.43	0.50	0.48	0.44
CAV	CAV	Lewis' woodpecker	EEIS BLM/FS	0.65	0.67	0.50	0.50	0.50	0.63	0.63	0.56	0.61
			EEIS CumEff	0.83	0.83	0.42	0.55	0.59	0.55	0.49	0.50	0.50
			UCRB BLM/FS	0.70	0.74	0.50	0.49	0.40	0.66	0.71	0.64	0.56
			UCRB CumEff	0.98	1.08	0.44	0.64	0.63	0.40	0.50	0.44	0.44
CAV	CAV	Pileated woodpecker	EEIS BLM/FS	0.76	0.67	0.17	0.50	0.50	0.50	0.58	0.50	0.50
			EEIS CumEff	0.76	0.67	0.17	0.50	0.50	0.50	0.58	0.50	0.50
			UCRB BLM/FS	0.71	0.73	0.17	0.50	0.50	0.50	0.51	0.50	0.50
			UCRB CumEff	0.71	0.73	0.17	0.50	0.50	0.50	0.51	0.50	0.50
CAV	CAV	Pygmy nuthatch	EEIS BLM/FS	0.26	0.17	0.41	0.56	0.63	0.50	0.68	0.50	0.35
			EEIS CumEff	0.26	0.17	0.41	0.56	0.63	0.50	0.68	0.50	0.35
			UCRB BLM/FS	0.26	0.17	0.41	0.56	0.66	0.49	0.63	0.49	0.35
			UCRB CumEff	0.26	0.17	0.41	0.56	0.66	0.49	0.63	0.49	0.35
CAV	CAV	Red-naped sapsucker	EEIS BLM/FS	0.00	0.44	0.82	0.44	0.52	0.46	0.70	0.46	0.66
			EEIS CumEff	0.00	0.44	0.71	0.37	0.47	0.44	0.57	0.44	0.62
			UCRB BLM/FS	0.00	0.44	0.82	0.44	0.52	0.46	0.70	0.46	0.66
			UCRB CumEff	0.00	0.44	0.71	0.37	0.47	0.44	0.57	0.44	0.62
CAV	CAV	Three-toed woodpecker	EEIS BLM/FS	0.50	0.32	0.64	0.44	0.52	0.19	0.35	0.35	0.45
			EEIS CumEff	0.50	0.20	0.64	0.44	0.52	0.19	0.35	0.35	0.45
			UCRB BLM/FS	0.50	0.32	0.64	0.39	0.50	0.19	0.35	0.35	0.42
			UCRB CumEff	0.50	0.20	0.64	0.39	0.50	0.19	0.35	0.35	0.42
CAV	CAV	Vaux's swift	EEIS BLM/FS	0.92	0.45	0.50	0.56	0.74	0.58	0.44	0.38	0.36
			EEIS CumEff	0.54	0.26	0.44	0.59	0.50	0.54	0.50	0.32	0.64
			UCRB BLM/FS	1.05	0.40	0.50	0.56	0.72	0.53	0.44	0.38	0.36
			UCRB CumEff	0.62	0.34	0.44	0.59	0.50	0.54	0.50	0.32	0.64
CAV	CAV	White-breasted nuthatch	EEIS BLM/FS	0.26	0.20	0.41	0.34	0.45	0.40	0.36	0.46	0.41
			EEIS CumEff	0.26	0.27	0.41	0.34	0.45	0.32	0.36	0.39	0.41
			UCRB BLM/FS	0.38	0.30	0.49	0.32	0.52	0.45	0.49	0.49	0.63
			UCRB CumEff	0.38	0.30	0.49	0.32	0.52	0.45	0.49	0.49	0.63
CAV	CAV	White-headed woodpecker	EEIS BLM/FS	0.43	0.54	0.44	0.51	0.74	0.39	0.77	0.48	0.66
			EEIS CumEff	0.43	0.54	0.51	0.55	0.51	0.44	0.73	0.46	0.70
			UCRB BLM/FS	0.43	0.53	0.44	0.51	0.63	0.46	0.78	0.41	0.70
			UCRB CumEff	0.43	0.53	0.48	0.39	0.52	0.44	0.76	0.44	0.74

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
CAV	CAV	Williamson's sapsucker	EEIS BLM/FS	0.26	0.54	0.67	0.52	0.71	0.52	0.60	0.60	0.58
			EEIS CumEff	0.26	0.54	0.57	0.51	0.74	0.58	0.73	0.58	0.53
			UCRB BLM/FS	0.26	0.48	0.51	0.41	0.65	0.61	0.55	0.64	0.58
			UCRB CumEff	0.26	0.48	0.55	0.44	0.63	0.63	0.55	0.67	0.53
PAS	FOR	Black-chinned hummingbird	EEIS BLM/FS	0.32	0.30	0.46	0.44	0.46	0.46	0.43	0.37	0.46
			EEIS CumEff	0.32	0.36	0.48	0.51	0.48	0.45	0.47	0.58	0.57
			UCRB BLM/FS	0.32	0.30	0.46	0.44	0.46	0.46	0.43	0.37	0.46
			UCRB CumEff	0.32	0.36	0.48	0.51	0.48	0.52	0.47	0.58	0.57
PAS	FOR	Broad-tailed hummingbird	UCRB BLM/FS	0.49	0.38	0.48	0.43	0.36	0.48	0.47	0.48	0.44
			UCRB CumEff	0.49	0.44	0.57	0.50	0.41	0.44	0.49	0.55	0.56
PAS	FOR	Chestnut-backed chickadee	EEIS BLM/FS	0.38	0.44	0.40	0.40	0.40	0.66	0.49	0.61	0.49
			EEIS CumEff	0.38	0.44	0.40	0.40	0.40	0.66	0.49	0.61	0.49
			UCRB BLM/FS	0.38	0.38	0.40	0.40	0.40	0.66	0.49	0.61	0.49
			UCRB CumEff	0.38	0.38	0.40	0.40	0.40	0.66	0.49	0.61	0.49
PAS	FOR	Hammond's flycatcher	EEIS BLM/FS	0.48	0.36	0.56	0.36	0.56	0.54	0.60	0.51	0.46
			EEIS CumEff	0.44	0.50	0.60	0.47	0.60	0.60	0.67	0.59	0.48
			UCRB BLM/FS	0.48	0.33	0.58	0.33	0.58	0.54	0.63	0.51	0.46
			UCRB CumEff	0.44	0.49	0.60	0.48	0.60	0.60	0.67	0.59	0.48
PAS	FOR	Lazuli bunting	EEIS BLM/FS	0.49	0.43	0.55	0.44	0.42	0.49	0.55	0.48	0.49
			EEIS CumEff	0.49	0.57	0.55	0.57	0.55	0.55	0.54	0.53	0.56
			UCRB BLM/FS	0.48	0.50	0.53	0.49	0.49	0.50	0.55	0.50	0.50
			UCRB CumEff	0.48	0.53	0.51	0.53	0.49	0.51	0.51	0.48	0.57
PAS	FOR	Olive-sided flycatcher	EEIS BLM/FS	0.40	0.48	0.50	0.52	0.50	0.46	0.50	0.46	0.44
			EEIS CumEff	0.40	0.50	0.51	0.50	0.51	0.50	0.57	0.50	0.50
			UCRB BLM/FS	0.40	0.37	0.49	0.48	0.47	0.46	0.50	0.45	0.42
			UCRB CumEff	0.40	0.47	0.50	0.50	0.50	0.49	0.52	0.47	0.48
PAS	FOR	Rufous hummingbird	EEIS BLM/FS	0.49	0.49	0.64	0.58	0.65	0.44	0.66	0.50	0.50
			EEIS CumEff	0.49	0.53	0.64	0.66	0.64	0.59	0.65	0.53	0.53
			UCRB BLM/FS	0.48	0.50	0.66	0.65	0.60	0.50	0.66	0.44	0.50
			UCRB CumEff	0.48	0.53	0.64	0.66	0.64	0.59	0.65	0.53	0.53
PAS	FOR	Rufous-sided towhee	EEIS BLM/FS	0.50	0.48	0.49	0.48	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.49	0.49	0.49	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.50	0.46	0.47	0.46	0.49	0.50	0.49	0.50	0.50
			UCRB CumEff	0.50	0.49	0.48	0.49	0.49	0.50	0.50	0.50	0.50
PAS	FOR	Western bluebird	EEIS BLM/FS	0.26	0.17	0.81	0.32	0.48	0.43	0.48	0.44	0.50
			EEIS CumEff	0.26	0.17	0.75	0.42	0.49	0.73	0.42	0.67	0.70
			UCRB BLM/FS	0.26	0.17	0.81	0.44	0.41	0.43	0.41	0.39	0.43
			UCRB CumEff	0.26	0.17	0.75	0.53	0.42	0.73	0.51	0.72	0.68
PAS	FOR	Western tanager	EEIS BLM/FS	0.30	0.30	0.46	0.33	0.30	0.30	0.46	0.30	0.30
			EEIS CumEff	0.33	0.33	0.71	0.64	0.64	0.64	0.73	0.64	0.64
			UCRB BLM/FS	0.30	0.30	0.45	0.33	0.30	0.30	0.45	0.30	0.30
			UCRB CumEff	0.33	0.33	0.71	0.64	0.64	0.64	0.73	0.64	0.64

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
PAS	FOR	White-winged crossbill	EEIS BLM/FS	0.00	0.00	0.48	0.00	0.22	0.36	0.48	0.00	0.36
			EEIS CumEff	0.30	0.30	0.44	0.30	0.22	0.55	0.46	0.26	0.48
			UCRB BLM/FS	0.00	0..00	0.48	0.00	0.22	0.36	0.48	0.00	0.36
			UCRB CumEff	0.30	0.30	0.44	0.30	0.22	0.55	0.46	0.26	0.48
PAS	FOR	Wilson's warbler	EEIS BLM/FS	0.43	0.50	0.50	0.50	0.50	0.50	0.46	0.49	0.46
			EEIS CumEff	0.43	0.50	0.50	0.50	0.50	0.50	0.46	0.49	0.46
			UCRB BLM/FS	0.40	0.49	0.50	0.50	0.50	0.49	0.47	0.48	0.44
			UCRB CumEff	0.40	0.49	0.50	0.50	0.50	0.49	0.47	0.48	0.44
PAS	FOR	Winter wren	EEIS BLM/FS	0.48	0.57	0.44	0.44	0.48	0.67	0.53	0.60	0.64
			EEIS CumEff	0.48	0.44	0.57	0.56	0.56	0.47	0.60	0.65	0.35
			UCRB BLM/FS	0.38	0.47	0.63	0.55	0.55	0.59	0.67	0.65	0.72
			UCRB CumEff	0.38	0.44	0.55	0.56	0.43	0.64	0.60	0.66	0.48
PAS	WD	Ash-throated flycatcher	EEIS BLM/FS	0.58	0.58	0.64	0.64	0.75	0.75	0.74	0.78	0.74
			EEIS CumEff	0.58	0.58	0.67	0.67	0.68	0.62	0.59	0.72	0.68
			UCRB BLM/FS	0.62	0.57	0.68	0.68	0.68	0.68	0.74	0.73	0.78
			UCRB CumEff	0.62	0.57	0.67	0.67	0.68	0.62	0.59	0.86	0.68
PAS	WD	Bushtit	EEIS BLM/FS	0.00	0.58	0.67	0.67	0.63	0.50	0.60	0.50	0.49
			EEIS CumEff	0.00	0.58	0.67	0.67	0.63	0.50	0.60	0.50	0.49
			UCRB BLM/FS	0.48	0.58	0.66	0.66	0.58	0.50	0.67	0.50	0.49
			UCRB CumEff	0.48	0.58	0.66	0.66	0.58	0.50	0.67	0.50	0.49
PAS	WD	Chipping sparrow	EEIS BLM/FS	0.22	0.25	0.25	0.25	0.25	0.22	0.25	0.22	0.22
			EEIS CumEff	0.22	0.35	0.49	0.49	0.49	0.48	0.49	0.48	0.48
			UCRB BLM/FS	0.22	0.25	0.25	0.25	0.25	0.22	0.25	0.22	0.22
			UCRB CumEff	0.22	0.35	0.49	0.49	0.49	0.48	0.49	0.48	0.48
PAS	WD	Green-tailed towhee	EEIS BLM/FS	0.48	0.44	0.49	0.50	0.50	0.50	0.49	0.50	0.50
			EEIS CumEff	0.48	0.44	0.49	0.50	0.50	0.50	0.49	0.50	0.50
			UCRB BLM/FS	0.48	0.44	0.49	0.50	0.50	0.50	0.49	0.50	0.50
			UCRB CumEff	0.48	0.44	0.49	0.50	0.50	0.50	0.49	0.50	0.50
PAS	RIP	Red-eyed vireo	EEIS BLM/FS	0.48	0.32	0.48	0.50	0.50	0.50	0.44	0.50	0.36
			EEIS CumEff	0.31	0.46	0.39	0.46	0.46	0.48	0.39	0.49	0.32
			UCRB BLM/FS	0.48	0.50	0.32	0.50	0.50	0.50	0.46	0.49	0.36
			UCRB CumEff	0.44	0.32	0.44	0.48	0.48	0.49	0.39	0.50	0.50
PAS	RIP	Red-winged blackbird	EEIS BLM/FS	0.38	0.50	0.48	0.46	0.46	0.46	0.48	0.45	0.45
			EEIS CumEff	0.38	0.50	0.57	0.60	0.60	0.60	0.57	0.59	0.59
			UCRB BLM/FS	0.38	0.50	0.48	0.46	0.46	0.46	0.49	0.47	0.45
			UCRB CumEff	0.38	0.50	0.57	0.60	0.60	0.60	0.57	0.61	0.61
PAS	RIP	Veery	EEIS BLM/FS	0.45	0.55	0.57	0.60	0.58	0.57	0.59	0.55	0.60
			EEIS CumEff	0.45	0.54	0.51	0.54	0.54	0.56	0.52	0.57	0.54
			UCRB BLM/FS	0.49	0.57	0.58	0.59	0.59	0.57	0.61	0.55	0.58
			UCRB CumEff	0.49	0.58	0.52	0.56	0.56	0.60	0.53	0.59	0.58
PAS	RIP	Willow flycatcher	EEIS BLM/FS	0.50	0.53	0.49	0.54	0.50	0.54	0.49	0.53	0.53
			EEIS CumEff	0.50	0.50	0.45	0.49	0.48	0.50	0.46	0.50	0.49
			UCRB BLM/FS	0.50	0.53	0.50	0.54	0.50	0.54	0.49	0.53	0.53
			UCRB CumEff	0.50	0.50	0.45	0.49	0.47	0.50	0.46	0.49	0.50

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
PAS	RIP	Yellow warbler	EEIS BLM/FS	0.49	0.48	0.50	0.49	0.49	0.46	0.50	0.45	0.47
			EEIS CumEff	0.49	0.50	0.47	0.50	0.50	0.50	0.44	0.50	0.50
			UCRB BLM/FS	0.49	0.48	0.50	0.49	0.49	0.46	0.50	0.45	0.47
			UCRB CumEff	0.49	0.50	0.47	0.50	0.50	0.50	0.44	0.50	0.50
PAS	RIP	Yellow-billed cuckoo	EEIS BLM/FS	0.50	0.50	0.45	0.21	0.21	0.22	0.22	0.50	0.50
			EEIS CumEff	0.50	0.30	0.30	0.44	0.44	0.45	0.00	0.46	0.44
			UCRB BLM/FS	0.48	0.50	0.45	0.21	0.21	0.22	0.22	0.50	0.50
			UCRB CumEff	0.46	0.34	0.31	0.44	0.44	0.46	0.00	0.46	0.45
PAS	RIP	Yellow-breasted chat	EEIS BLM/FS	0.50	0.50	0.49	0.50	0.36	0.49	0.49	0.48	0.50
			EEIS CumEff	0.49	0.48	0.46	0.49	0.48	0.50	0.25	0.36	0.50
			UCRB BLM/FS	0.50	0.50	0.50	0.50	0.50	0.35	0.49	0.48	0.49
			UCRB CumEff	0.49	0.48	0.46	0.49	0.48	0.50	0.25	0.36	0.50
PAS	GS	Black rosy finch	EEIS BLM/FS	0.00	0.00	0.47	0.47	0.20	0.00	0.47	0.00	0.00
			EEIS CumEff	0.00	0.00	0.47	0.47	0.20	0.00	0.47	0.00	0.00
			UCRB BLM/FS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			UCRB CumEff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAS	GS	Bobolink	EEIS BLM/FS	0.46	0.49	0.50	0.54	0.54	0.49	0.50	0.48	0.53
			EEIS CumEff	0.49	0.50	0.45	0.70	0.71	0.66	0.44	0.65	0.58
			UCRB BLM/FS	0.48	0.56	0.54	0.66	0.66	0.60	0.54	0.59	0.66
			UCRB CumEff	0.48	0.48	0.50	0.68	0.68	0.63	0.50	0.62	0.65
PAS	GS	Brewer's blackbird	EEIS BLM/FS	0.27	0.30	0.60	0.33	0.39	0.31	0.61	0.31	0.35
			EEIS CumEff	0.27	0.67	0.68	0.69	0.69	0.70	0.68	0.71	0.69
			UCRB BLM/FS	0.27	0.30	0.60	0.33	0.39	0.31	0.61	0.31	0.35
			UCRB CumEff	0.27	0.67	0.67	0.69	0.69	0.70	0.68	0.71	0.69
PAS	GS	Brewer's sparrow	EEIS BLM/FS	0.46	0.49	0.68	0.72	0.72	0.73	0.62	0.73	0.68
			EEIS CumEff	0.44	0.71	0.62	0.64	0.64	0.66	0.60	0.64	0.68
			UCRB BLM/FS	0.48	0.72	0.70	0.74	0.74	0.76	0.64	0.78	0.69
			UCRB CumEff	0.47	0.63	0.61	0.62	0.61	0.66	0.60	0.64	0.68
PAS	GS	Grasshopper sparrow	EEIS BLM/FS	0.50	0.24	0.24	0.24	0.20	0.41	0.20	0.47	0.27
			EEIS CumEff	0.50	0.24	0.24	0.24	0.20	0.39	0.20	0.46	0.27
			UCRB BLM/FS	0.56	0.38	0.44	0.44	0.51	0.52	0.47	0.57	0.51
			UCRB CumEff	0.56	0.40	0.38	0.38	0.53	0.51	0.36	0.52	0.40
PAS	GS	Horned lark	EEIS BLM/FS	0.54	0.50	0.50	0.50	0.49	0.44	0.50	0.44	0.46
			EEIS CumEff	0.54	0.50	0.65	0.65	0.65	0.66	0.60	0.67	0.66
			UCRB BLM/FS	0.54	0.50	0.50	0.50	0.49	0.44	0.50	0.44	0.44
			UCRB CumEff	0.54	0.50	0.65	0.65	0.65	0.66	0.60	0.67	0.66
PAS	GS	Lark sparrow	EEIS BLM/FS	0.47	0.50	0.68	0.72	0.72	0.73	0.62	0.73	0.68
			EEIS CumEff	0.46	0.66	0.60	0.61	0.61	0.64	0.58	0.65	0.62
			UCRB BLM/FS	0.49	0.71	0.70	0.74	0.74	0.76	0.64	0.78	0.69
			UCRB CumEff	0.48	0.63	0.61	0.62	0.61	0.66	0.60	0.65	0.67
PAS	GS	Loggerhead shrike	EEIS BLM/FS	0.48	0.66	0.77	0.82	0.82	0.83	0.75	0.79	0.80
			EEIS CumEff	0.48	0.94	0.73	0.73	0.73	0.66	0.78	0.74	0.68
			UCRB BLM/FS	0.48	0.66	0.77	0.82	0.82	0.82	0.76	0.78	0.83
			UCRB CumEff	0.48	0.94	0.70	0.70	0.70	0.65	0.76	0.74	0.72

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
PAS	GS	Sage sparrow	EEIS BLM/FS	0.42	0.48	0.72	0.73	0.73	0.75	0.67	0.75	0.66
			EEIS Cum/Eff	0.39	0.67	0.68	0.69	0.69	0.71	0.67	0.62	0.70
			UCRB BLM/FS	0.42	0.48	0.72	0.73	0.73	0.75	0.67	0.75	0.66
			UCRB CumEff	0.39	0.64	0.68	0.68	0.67	0.71	0.67	0.62	0.70
PAS	GS	Sage thrasher	EEIS BLM/FS	0.46	0.49	0.68	0.72	0.72	0.73	0.62	0.73	0.68
			EEIS CumEff	0.44	0.64	0.64	0.65	0.64	0.66	0.62	0.73	0.66
			UCRB BLM/FS	0.48	0.80	0.70	0.74	0.74	0.76	0.64	0.78	0.69
			UCRB CumEff	0.47	0.61	0.62	0.65	0.64	0.66	0.62	0.65	0.69
PAS	GS	Vesper sparrow	EEIS BLM/FS	0.40	0.48	0.67	0.67	0.67	0.67	0.69	0.62	0.67
			EEIS CumEff	0.35	0.66	0.56	0.56	0.56	0.58	0.57	0.59	0.56
			UCRB BLM/FS	0.40	0.48	0.67	0.67	0.67	0.67	0.69	0.62	0.67
			UCRB CumEff	0.35	0.67	0.57	0.57	0.57	0.59	0.57	0.61	0.57
PAS	GS	Western meadowlark	EEIS BLM/FS	0.27	0.30	0.49	0.49	0.49	0.46	0.50	0.44	0.49
			EEIS CumEff	0.27	0.30	0.49	0.49	0.49	0.50	0.49	0.50	0.50
			UCRB BLM/FS	0.27	0.30	0.49	0.49	0.49	0.46	0.50	0.44	0.49
			UCRB CumEff	0.27	0.30	0.49	0.49	0.49	0.50	0.49	0.50	0.50
BSM	BAT	Fringed myotis	EEIS BLM/FS	0.51	0.58	0.71	0.63	0.67	0.72	0.64	0.70	0.72
			EEIS CumEff	0.51	0.59	0.40	0.49	0.49	0.56	0.46	0.69	0.67
			UCRB BLM/FS	0.48	0.58	0.70	0.62	0.62	0.62	0.74	0.65	0.72
			UCRB CumEff	0.51	0.59	0.42	0.50	0.49	0.56	0.48	0.67	0.66
BSM	BAT	Hoary bat	EEIS BLM/FS	0.42	0.57	0.65	0.86	0.63	0.76	0.75	0.79	1.00
			EEIS CumEff	0.42	0.73	0.71	0.65	0.71	0.70	0.64	0.75	0.69
			UCRB BLM/FS	0.42	0.55	0.62	0.78	0.77	0.75	0.69	0.85	0.97
			UCRB CumEff	0.42	0.73	0.59	0.62	0.64	0.68	0.64	0.74	0.68
BSM	BAT	Long-eared myotis	EEIS BLM/FS	0.49	0.61	0.60	0.76	0.64	0.73	0.57	0.77	0.80
			EEIS CumEff	0.49	0.66	0.64	0.72	0.66	0.71	0.61	0.76	0.70
			UCRB BLM/FS	0.49	0.61	0.58	0.76	0.62	0.67	0.67	0.77	0.80
			UCRB CumEff	0.49	0.66	0.64	0.66	0.66	0.71	0.67	0.77	0.71
BSM	BAT	Long-legged myotis	EEIS BLM/FS	0.48	0.65	0.68	0.73	0.70	0.65	0.64	0.62	0.69
			EEIS CumEff	0.48	0.52	0.46	0.66	0.39	0.56	0.46	0.72	0.68
			UCRB BLM/FS	0.48	0.65	0.72	0.69	0.67	0.69	0.59	0.65	0.79
			UCRB CumEff	0.48	0.52	0.46	0.59	0.59	0.56	0.46	0.70	0.52
BSM	BAT	Pale western big-eared bat	EEIS BLM/FS	0.52	0.53	0.54	0.47	0.58	0.47	0.60	0.55	0.55
			EEIS CumEff	0.52	0.56	0.43	0.49	0.50	0.54	0.40	0.57	0.56
			UCRB BLM/FS	0.52	0.53	0.54	0.47	0.59	0.46	0.60	0.54	0.61
			UCRB CumEff	0.52	0.55	0.44	0.49	0.50	0.54	0.40	0.56	0.56
BSM	BAT	Silver-haired bat	EEIS BLM/FS	0.54	0.54	0.72	0.75	0.62	0.69	0.70	0.62	0.69
			EEIS CumEff	0.49	0.69	0.62	0.73	0.73	0.86	0.64	0.83	0.73
			UCRB BLM/FS	0.54	0.54	0.74	0.67	0.66	0.71	0.90	0.66	0.66
			UCRB CumEff	0.49	0.69	0.62	0.73	0.73	0.85	0.64	0.84	0.73

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
BSM	BAT	Spotted bat	EEIS BLM/FS	0.32	0.48	0.33	0.30	0.22	0.29	0.50	0.23	0.48
			EEIS CumEff	0.32	0.49	0.19	0.21	0.48	0.22	0.46	0.21	0.50
			UCRB BLM/FS	0.32	0.48	0.32	0.29	0.22	0.27	0.50	0.21	0.48
			UCRB CumEff	0.32	0.49	0.50	0.50	0.48	0.50	0.04	0.48	0.50
BSM	BAT	Western small-footed myotis	EEIS BLM/FS	0.40	0.46	0.46	0.78	0.78	0.78	0.46	0.78	0.60
			UCRB BLM/FS	0.40	0.46	0.46	0.78	0.78	0.78	0.46	0.78	0.60
BSM	SMM	Northern flying squirrel	EEIS BLM/FS	0.30	0.83	0.70	0.86	0.83	0.80	0.72	0.80	0.68
			EEIS CumEff	0.32	0.80	0.39	0.57	0.49	0.59	0.67	0.61	0.71
			UCRB BLM/FS	0.30	0.83	0.82	0.80	0.85	0.73	0.86	0.71	0.85
			UCRB CumEff	0.32	0.77	0.59	0.50	0.64	0.73	0.50	0.72	0.71
BSM	SMM	Pygmy rabbit	EEIS BLM/FS	0.64	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.64	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
BSM	SMM	White-tailed jackrabbit	EEIS BLM/FS	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
			EEIS CumEff	0.40	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
			UCRB BLM/FS	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
			UCRB CumEff	0.40	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
C&U	CAR	American marten	EEIS BLM/FS	0.50	0.84	0.75	0.84	0.84	0.57	0.70	0.57	0.64
			EEIS CumEff	0.50	0.84	0.64	0.72	0.73	0.77	0.64	0.78	0.88
			UCRB BLM/FS	0.76	1.01	0.79	0.88	0.88	0.64	1.00	0.64	0.64
			UCRB CumEff	0.76	0.87	0.75	0.83	0.83	0.81	0.79	0.87	0.79
C&U	CAR	Fisher	EEIS BLM/FS	1.01	0.44	0.39	0.58	0.59	0.85	0.35	0.85	0.75
			EEIS CumEff	1.01	0.40	0.27	0.40	0.24	0.40	0.24	0.40	0.70
			UCRB BLM/FS	0.75	0.75	0.70	0.67	0.67	0.67	0.75	0.67	0.70
			UCRB CumEff	0.75	0.44	0.51	0.48	0.42	0.49	0.42	0.59	0.72
C&U	CAR	Gray wolf	EEIS BLM/FS	0.64	0.68	0.70	0.67	0.70	0.67	0.70	0.69	0.71
			EEIS CumEff	0.70	0.78	0.72	0.78	0.72	0.82	0.72	0.89	0.93
			UCRB BLM/FS	0.52	0.75	0.79	0.75	0.79	0.75	0.78	0.76	0.78
			UCRB CumEff	0.52	0.99	0.63	0.68	0.66	0.68	0.63	0.72	0.77
C&U	CAR	Grizzly bear	EEIS BLM/FS	0.73	0.69	0.58	0.59	0.59	0.57	0.58	0.57	0.78
			EEIS CumEff	0.63	0.38	0.24	0.27	0.27	0.27	0.27	0.29	0.65
			UCRB BLM/FS	0.61	1.18	1.03	1.07	1.03	1.08	1.03	1.19	1.22
			UCRB CumEff	0.67	0.47	0.40	0.44	0.44	0.47	0.40	0.75	0.92
C&U	CAR	Lynx	EEIS BLM/FS	0.45	0.69	0.50	0.50	0.78	0.50	0.51	0.78	0.79
			EEIS CumEff	0.45	0.50	0.51	0.51	0.51	0.51	0.30	0.50	0.50
			UCRB BLM/FS	0.45	0.69	0.50	0.50	0.78	0.50	0.51	0.85	0.78
			UCRB CumEff	0.45	0.49	0.51	0.51	0.51	0.51	0.30	0.50	0.50
C&U	CAR	Wolverine	EEIS BLM/FS	0.45	0.69	0.58	0.59	0.59	0.57	0.58	0.57	0.64
			EEIS CumEff	0.84	0.49	0.00	0.22	0.00	0.24	0.00	0.24	0.79
			UCRB BLM/FS	0.45	0.83	0.89	0.90	0.89	0.92	0.90	0.92	0.86
			UCRB CumEff	0.84	0.20	0.14	0.30	0.14	0.27	0.14	0.30	0.85

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
C&U	UNG	California bighorn sheep	EEIS BLM/FS	0.50	0.49	0.49	0.50	0.49	0.49	0.50	0.49	0.30
			EEIS CumEff	0.50	0.46	0.46	0.49	0.46	0.46	0.49	0.46	0.30
			UCRB BLM/FS	0.50	0.49	0.49	0.50	0.49	0.49	0.50	0.49	0.30
			UCRB CumEff	0.50	0.46	0.46	0.49	0.46	0.46	0.49	0.46	0.30
C&U	UNG	Pronghorn	EEIS BLM/FS	0.45	0.50	0.63	0.63	0.49	0.46	0.63	0.46	0.63
			EEIS CumEff	0.45	0.70	0.64	0.64	0.64	0.64	0.64	0.64	0.64
			UCRB BLM/FS	0.45	0.67	0.64	0.64	0.48	0.46	0.64	0.46	0.64
			UCRB CumEff	0.45	0.49	0.64	0.64	0.64	0.64	0.64	0.64	0.64
C&U	UNG	Woodland caribou	EEIS BLM/FS	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50
			EEIS CumEff	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50
			UCRB BLM/FS	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50
			UCRB CumEff	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50

[1]Panel - BSM - bat and small mammal panel; CAV - cavity nesting woodpeckers, swifts, and nuthatches; C&U - mammalian carnivore and ungulate panel; HER - amphibian and reptile panel; PAS - passerine and other birds; RGB - raptor and game bird panel; WAT - waterbird and shorebird panel.

[2]Group - Group within panel: AMP - amphibian; REP - reptile; FOR - forest passerine; WD - woodland passerine; GS - grassland & shrub passerine; RIP - riparian passerine; RAP - raptor; GMB - gamebird; BAT - bat; SMM - small mammal; CAR - carnivore; UNG - ungulate.

[3]Area - EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[4]Period / Alternative - H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

CHAPTER 5

Economic Evaluation of the Preliminary Draft EIS Alternatives

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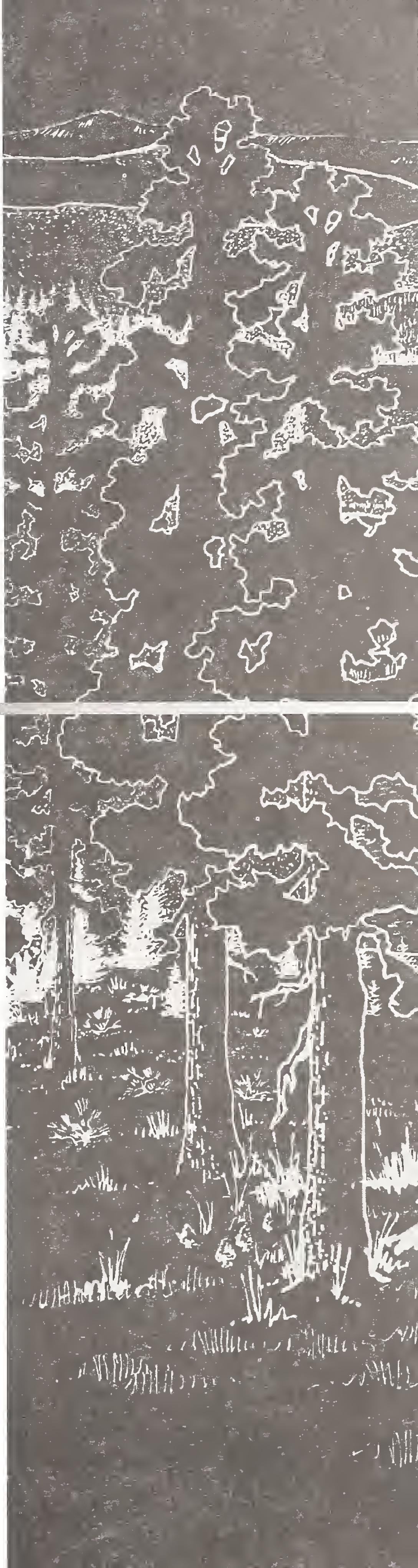

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Economic Overview

This economic evaluation of the preliminary draft Environmental Impact Statement (EIS) alternatives is based on data, methods, and analysis reported in the Economic Assessment chapter (Haynes and Horne, in press) of the *Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins* (Quigley and Arbelbide, in press). It begins with a summary of our findings about the current economic condition of the Basin.[1] We then examine the primary and secondary effects of each alternative using measures of outputs provided by the EIS teams [animal unit months (AUMs), Recreation Opportunity Spectrum (ROS) acres, timber harvest, and unroaded areas].[2] We identify effects on specific economic sectors for the Basin as a whole and for particular counties. Using the concept of economic resiliency, we discuss the impact of the alternatives against the backdrop of the changing Basin economy. We then evaluate the effect of the alternatives on efficient use of Federal land resources in which efficiency is defined as the benefits provided, not cash flows. In the final section, we discuss the effects of the alternatives on the distribution of costs and benefits among the American people.

The Basin is currently enjoying robust economic growth. Per capita income is growing faster than the national rate in Idaho, Oregon, and Washington (but not in Montana). Poverty rates are lower than the United States average. Unemployment rates in Idaho and Montana are lower than the U.S. average. Earnings per job are increasing faster than the U.S. average in all of the Basin states except Idaho (Haynes and Horne, in press). Except for Montana, the difference in per capita income between metropolitan and non-metropolitan counties is less than the average for the United States. Employment growth in the Basin has averaged 2 percent per year for the past two decades.

The Basin supports a diversity of lifestyles, but those based on agriculture are a significantly higher proportion than in the nation. Farm owners, tenants, rural farm-town families, and ranch families represent 19 percent of all households in the Basin, compared with 2 percent in the nation (Claritas Corporation 1994). This supports the perception that the Basin is more rural in character than are other regions in the United States.

An important determinant of recent economic growth in the Basin is population change. Between 1990 and 1994, 96 of the 100 counties increased in population, reversing the trend of the 1980s (McCool and Haynes 1996). The fastest growing economic sectors are services (including health, business, education, and law), trade, FIRE (finance, insurance, and real estate), and transportation. Manufacturing (including timber, plywood, and paper), farming, and especially the government sector continue to hold steady or to lose jobs. These trends have been viewed by some as a general decoupling of rural economies from traditional resource extraction and associated manufacturing activities (Galston and Baehler 1995). Regulatory and management challenges are increasingly driven by population growth and its associated residential developments and demand for public services. For the Forest Service (FS) and Bureau of Land Management (BLM), the increase in residences adjacent to Federal lands elevates the costs and political stakes of fire suppression.

This recent population growth is changing the economic character of the Basin by diversifying its human capital[3] and increasing its economic

[1]The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades in Oregon and Washington and those portions of the Klamath River basin and the Great Basin in Oregon.

[2]Unless otherwise noted output measures come from other staff areas and are described in project documents and science materials; on file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

[3]Economists consider capital to broadly include how new knowledge increases human ability to produce goods and services.

resiliency.[4] Twenty-one non-metropolitan counties with significant recreation opportunities have very high growth rates due to in-migration (Johnson and Beale 1995). The six metropolitan counties have more moderate growth rates. The 77 counties that are in neither the recreation nor the urban category are experiencing slower rates of growth. The 21 recreation counties account for 24 percent of the total population increase in the Basin and 29 percent of the total net migration (McCool and others, in press). Some rural counties are growing rapidly because they attract retirees and people whose lifestyles appear to be more oriented toward the natural environment, who have occupations related to natural resources, or who enjoy recreation activities.

Of the Federal land uses in the Basin that we could evaluate, recreation has the highest value, followed by timber, and then range. Fifteen percent of employment in the Basin is attributable to recreation and FS- and BLM-administered lands supply 80 percent of the recreation net economic benefit (Haynes and Horne, in press). Traditional natural-resources jobs (mining, wood products manufacturing, and ranching) currently account for 4 percent of employment in the Basin. Further detail on each of these sectors is described in the following sections.

Recreation supports more than 200,000 jobs in the Basin and provides approximately $1.2 billion in economic benefits when measured using willingness to pay (Haynes and Horne, in press). Hunting, motor viewing, and day use are the recreational activities that support the greatest number of jobs, while recreational fishing, day use, winter sports, hunting, and camping provide the greatest value in terms of willingness to pay (Haynes and Horne, in press). Although these economic effects are considerable, the Federal Government and other local governments in the Basin receive little financial benefit for providing recreational experiences. The financial benefits of recreational spending accrue mainly to private sector enterprises that provide food, lodging, equipment, supplies, or outfitting/guiding services. Per acre value of recreation use in the Basin is highest on the eastern slope of the Cascade Mountains—the area closest to the population centers in western Oregon and Washington. The overall condition of scenery in the Basin contributes to the quality of recreational experiences; five Ecological Reporting Units (ERUs) (Northern Great Basin, Owyhee Uplands, Upper Snake, Snake Headwaters, and Central Idaho Mountains) may be the most visually intact, unmodified areas in the contiguous United States (McCool and others, in press).

Livestock grazing has been a longstanding use of Federal lands in the region. In the past two decades, ranching industry consolidations and a long-term shift to grain-fed beef have reduced the number of producers in the Basin. About 21,000 people are currently employed in ranching operations. Ranchers in the Basin rely on Federal lands for 7 percent of their annual forage needs, although the reliance on Federal forage is higher during the spring and summer seasons.

Employment in mining and manufacturing are less important in the Basin than for the nation as a whole. Timber manufacturing accounts for roughly 40,000 jobs or approximately 20 percent of the manufacturing jobs in the Basin. It is most important in the eastern Oregon economy as well as locally significant in a number of small communities in northern and central Idaho, northeastern Washington, and western Montana. In 1991, the Basin accounted for 12 percent of softwood harvest in the United States. That year, the National Forests provided 46 percent of the timber harvest in the Basin (the contribution of BLM-administered lands to timber harvest in the Basin was negligible).

[4]Resiliency is defined as adaptability to change (Haynes and others 1996). Economic systems with high resiliency are those capable of absorbing external shocks, such as a recession, and rebounding in terms of system indicators, such as total employment and per capita income.

Evaluation of the Alternatives

This evaluation of the seven preliminary draft EIS alternatives answers three questions which together constitute a comprehensive economic analysis of the alternatives. The first question is "what would be the effect of the alternatives on economic well-being in the Basin?" The traditional measure of effects on economic well-being is job impacts. This, however, is a poor proxy because it fails to adequately consider the dynamic, temporal dimension of economies. We attempt to incorporate this dimension using the measure of economic resiliency. The second question is "what would be the effect of the alternatives on economic efficiency, or the values provided to society by the FS- and BLM-administered lands in the Basin?" Our answer provides a rough benefit-cost analysis of the alternatives. The third, "what would be the effect of the alternatives on equity, or the distribution of benefits throughout society?" addresses the question of who gains and who loses.

Haynes and Horne (in press) conducted analyses at three spatial scales: national, the study area (the Basin), and two sets of subregions [ERUs for summarizing ecosystem outputs, and Bureau of Economic Analysis (BEA) areas[5] for evaluating economic activity]. We add a fourth spatial scale in this analysis, the county, in order to identify more local impacts under the preliminary draft EIS alternatives. For reference, map 5.1 shows the counties found within the Basin. This evaluation considers results of the first decade of implementation (1995-2005) because it is the standard timeframe for evaluating EIS alternatives, and because we have greater confidence in our projections over a 10-year period than for longer time spans. We considered Alternative 2 closest to continuation of current activity since it set harvest at 1993 levels, and maintained existing road networks and grazing levels expected under current policy. Alternatives 1 and 5 assumed higher levels of timber harvest. The road building that would accompany these higher levels would also affect recreation activity and unroaded areas.

Economic Activity

The effects of the seven preliminary draft EIS alternatives on the regional economies of the Basin are subtle. The alternatives affect 0.1 percent of all jobs in the Basin, or 1.0 percent of those based on FS- and BLM-administered lands. Differences in economic resiliency may be observable during the first decade after implementation in 4 of the 100 counties in the Basin (Adams County, Idaho; Lincoln County, Montana; and Grant and Lake Counties, Oregon). However, larger and more numerous differences might be observable over several decades, depending on which alternative is chosen. The question of the impacts on economic activity can be divided into three parts: direct job impacts; counties; and economic resiliency.

Direct jobs—The alternatives will probably have little effect on the total number of jobs supported by resources from BLM- and FS-administered lands. In 1990 there were 1.5 million jobs in the Basin, and jobs were expected to increase by 110,000 during the 1990s (Haynes and Horne, in press). Of that 1.5 million, FS- and BLM-administered lands support roughly 240,000 jobs, of which 94 percent is in recreation, 5 percent in timber, and 1 percent in range. The number of jobs associated with the various alternatives is within 1 percent of the number expected under continuation of current plans (Alternative 1). The main effect of the alternatives would be to switch relatively few jobs between those in the range and timber sectors, to those supported by recreation activity.

Our focus on employment is as a proxy for economic well-being. It also does not recognize the potential for timber-sector jobs to have higher incomes than jobs in the recreation sector. Often timber jobs are thought to have a more positive impact on local economies than recreation jobs because they have higher income multipliers. But

[5] These are multi-county areas based on commuting patterns defined by the Bureau of Economic Analysis (BEA).

this approach is static, assuming no change in the economy other than that affected by policy. This ignores the reality that economies are dynamic and interactions at regional, national, and international scales may overwhelm or offset any impact of FS and BLM decisions. Because of this, we are more concerned about the effect of FS and BLM decisions on the ability of an economy to adapt to change. Further, a complete comparison of the economic development impacts of recreation versus manufacturing requires consideration of more than income multipliers. This is because personal income is derived from investments and transfers as well as from earned income. In recreation counties, per capita income is higher than in manufacturing counties in part because they attract people who derive a greater proportion of their income from non-salary sources (Haynes and Horne, in press).

Range jobs—The alternatives would probably have relatively small effects on ranching jobs over the next decade because FS- and BLM-administered lands provide only 7 percent of the forage for cattle and sheep in the Basin. Small reductions from current levels are expected even with no change in policy (Alternative 2) reflecting recent unrelated changes in management. For the Basin as a whole, Alternatives 3, 4, and 6 do not affect range jobs relative to Alternative 2. Alternative 5 may increase range jobs by 100, while Alternative 7 may decrease range jobs by 400. In the EEIS, Alternative 5 may increase range jobs by 100, and Alternative 7 may decrease range jobs by 100. In the UCRB, no effect on range jobs is foreseen for any Alternative except 7 which may decrease range jobs by 300.

Range jobs were calculated by multiplying the number of animal unit months (AUMs) after 10 years under each alternative by the number of jobs per AUM. The midpoints of reductions in Federal AUMs for each alternative were:[6]

Alternatives	AUMs	Reduction
	Thousands	Percent
1	272	9.5
2	315	11
3	287	10
4	315	11
5	100	3.5
6	315	11
7	1,433	50

The number of AUMs after a decade was then determined by subtracting their reductions from our most recent number of AUMs on BLM- and FS-administered lands in the Basin (2.86 million AUMs in 1993[7]). The projected number of AUMs was apportioned between the two EIS planning areas and federal agencies according to the 1993 distribution:

	UCRB	EEIS	Total
	------ Millions ------		
FS	1.01	0.29	1.30
BLM	1.10	0.46	1.56
Total	2.11	0.75	2.86

The number of jobs per AUM was calculated to be 0.00036. This was determined by multiplying an earlier estimate of 0.0003 (Haynes and others 1992) by 1.2 to account for the seasonal pattern of Federal allotments. The factor of 1.2 was derived by assuming: a constant herd size, that Federal grazing reductions during spring and summer grazing seasons could be offset from other feed sources by 10 percent, and a fixed seasonal pattern for Federal grazing allotments.[8] This means that there would be no forage substitution for 20 percent of the AUMs, and there would be a consequent 20 percent increase in the effect on

[6]Thomas G. Miles and Michael G. Karl developed these estimates. Their assumptions and methods are documented in a February 26, 1996 memo. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

[7]Data on file with: the U.S. Department of Agriculture, Forest Service, Forestry Sciences Laboratory, 1221 SW Yamhill, PO Box 3890, Portland, OR 97208.

[8]The seasonal distribution of public grazing allotments for Oregon, Washington, Idaho, and Montana average 34, 33, 23, and 10 percent in the spring, summer, fall, and winter seasons (see table 6.15 in Haynes and Horne, in press).

jobs of a reduction in Federal AUMs. We also assumed that jobs per AUM would remain constant over the next decade.

Recreation jobs—The alternatives may have a more substantial and positive effect on jobs associated with recreation activity over the next decade. Alternatives 3, 4, 6, and 7 would have no effect relative to Alternative 2. Alternative 1 would decrease jobs by 8,000, 75 percent of which would occur in the UCRB planning area (see table 5.1). The 6,600 decrease in recreation jobs associated with Alternative 5 would be more modest, 80 percent of which would occur in the UCRB planning area. These near-term decreases would result because Alternatives 1 and 5 assume more road construction than Alternative 2. As the population becomes more elderly in the future, lower road densities may decrease recreation activity.

Recreation jobs were calculated by multiplying estimates of recreation activity after 10 years under each alternative by the number of jobs supported by that activity. Recreation activity was determined from estimates of the number of acres in each Recreation Opportunity Spectrum[9] class under each alternative and population projections for Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming in the year 2005 (U.S. Department of Commerce 1992). Alternatives 2, 3, 4, 6, and 7 would maintain the current distribution of ROS acres. Roaded natural acres would increase under Alternative 5 and even more so under Alternative 1. With these inputs of population and ROS acres, we used a recreation model described in Haynes and Horne (in press), to calculate the number of activity days occurring on FS- and BLM-administered lands in each ERU for each of the 12 recreation activities. These numbers were then apportioned from ERUs to BEA areas.

The recreation response coefficients, or number of jobs per recreation activity day for each of 12 recreation activities for each BEA area, were obtained from Greg Alward (see appendix 6-B in Haynes and Horne, in press). These were computed from direct expenditures for items such as food, lodging, transportation, fishing guides, and ski lift tickets. These response coefficients are quite small; for example, 1,000 camping activity days in the Boise BEA area generate half of one job. In some parts of the Basin, however, the magnitude of recreation activity generates a substantial number of jobs. To simplify this calculation, we assumed that expenditures that do not occur in the same BEA area as recreation activities will offset each other.

We can infer a barrier to implementation from our analysis. Recreation and unroaded areas are highly valuable outputs from FS- and BLM-administered lands in the Basin (Haynes and Horne, in press; also see the following "Economic Efficiency" section of this chapter). If the chosen alternative is perceived as a threat to the recreation opportunities and unroaded areas provided by these lands, negative public opinion may inhibit implementation.

For two reasons we are less certain about the absolute magnitude of recreation jobs illustrated in our analysis results than the relative differences between alternatives. The first reason is that we believe that more acres would shift from roaded natural to primitive/semi-primitive settings than are shown in this analysis. These numbers were derived by assuming no decrease in roaded natural settings from current conditions under Alternatives 2, 3, 4, 6, and 7, minor increases under Alternative 5, and the largest increases under the continuation of current management. Yet, National Forests are currently implementing policies to close roads and there are concerns about maintaining the existing road network given limited budgets. The second reason is that we think the recreation response coefficients probably overestimate the number of jobs associated with recreation activity.

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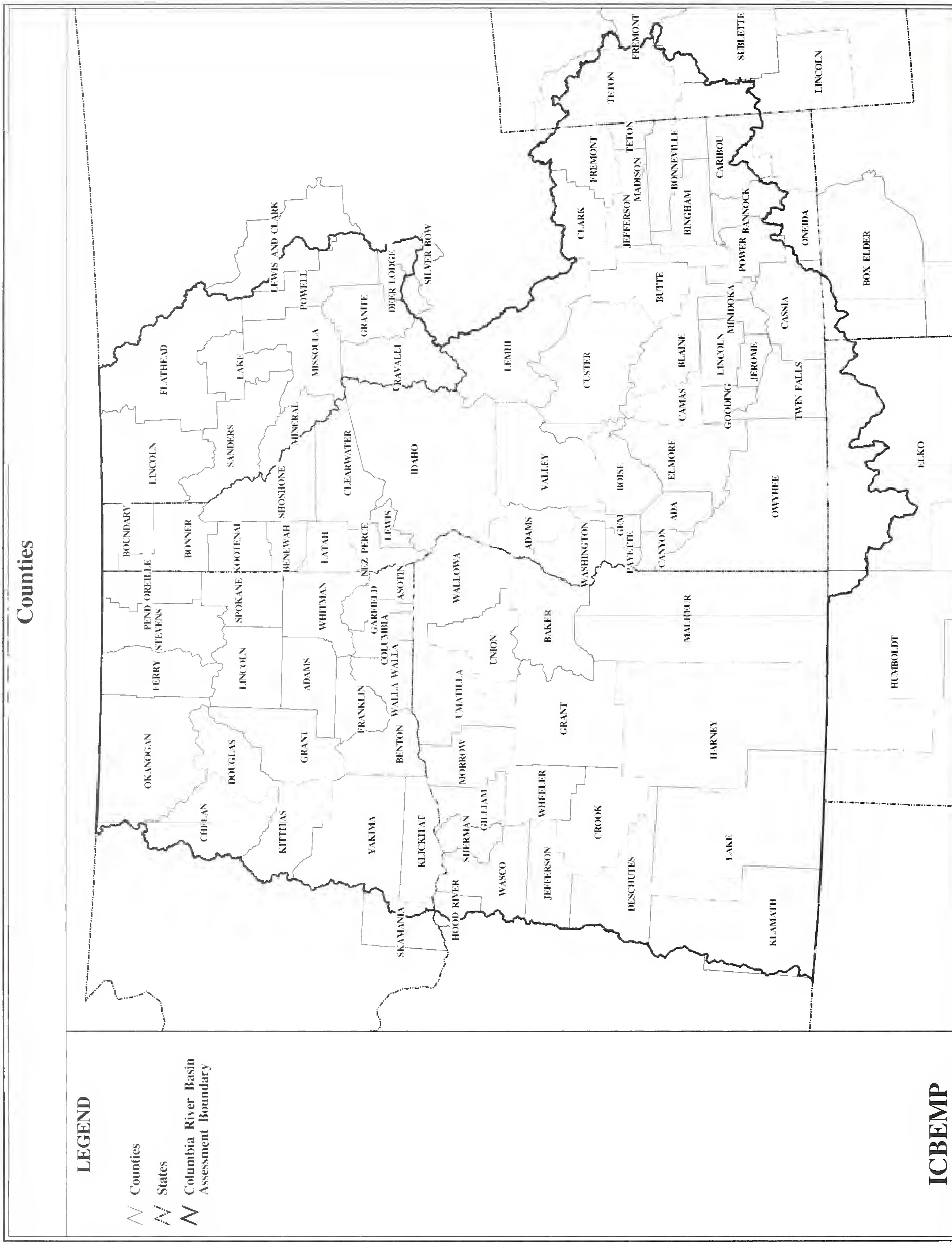
[9]There were three ROS classes used: natural, primitive/semi-primitive, and rural/urban. The FS- and BLM-administered lands in the Basin were divided among the three classes as 59, 40, and 1 percent, respectively.



Map 5.1 — Map of the counties found within the Basin.

Table 5.1— Employment levels based on Federal lands in the Basin[1] by EIS planning area (EEIS, UCRB), and employment sectors.

Area[2]/Sectors	Alternative 1	2	3	4	5	6	7
	Thousands of jobs						
EEIS							
Range	0.2	0.2	0.2	0.2	0.3	0.2	0.1
Recreation	105.9	107.9	107.9	107.9	106.6	107.9	107.9
Timber (SIC 24)[3]	13.1	6.1	5.6	5.9	7.1	4.8	2.4
Total EEIS	119.2	114.2	113.7	114	114	112.9	110.4
UCRB							
Range	0.7	0.7	0.7	0.7	0.7	0.7	0.4
Recreation	113.4	119.3	119.3	119.3	119.3	119.3	119.3
Timber (SIC 24)[3]	8.6	6.4	8.7	7.3	10.8	4.7	3.4
Total UCRB	122.7	126.4	128.7	127.3	130.8	124.7	123.1
Basin							
Range	0.9	0.9	0.9	0.9	1.0	0.9	0.5
Recreation	219.3	227.3	227.3	227.3	225.9	227.3	227.3
Timber (SIC 24)[3]	21.7	12.5	14.3	13.2	17.9	9.5	5.8
Timber (SIC 08)[4]	0.2	0.1	0.1	0.1	0.1	0.1	0
Total Basin	242.1	240.8	242.6	241.5	244.9	237.8	233.6

[1]The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those portions of the Klamath River basin and the Great Basin in Oregon.

[2]Area: EEIS - Eastern Oregon and Washington planning area; UCRB - Upper Columbia River Basin planning area.

[3]SIC 24 Employment computed using midpoint values for timber harvest from the EIS activity tables.

[4]SIC 08 Number of forestry workers.

Timber jobs—The effects on timber jobs over the next decade would be of similar magnitude as recreation but would vary more widely. Using Alternative 2 as an approximation of current harvest, estimates range from a loss of 6,700 jobs to a gain of 5,400 jobs depending on the alternative (table 5.1). This approach estimates only the direct employment effects, and does not assume offsetting increases in harvest from non-Federal lands. In the EEIS planning area, all alternatives (except for Alternative 5) would reduce wood products employment levels relative to those expected under Alternative 2. The situation in the UCRB planning area would be quite different however, where only Alternatives 6 and 7 would have negative impacts on employment. Alternatives 3, 4, and 5 would have positive impacts on timber employment relative to the 1993 employment levels.

Timber jobs were calculated using the same approach used in FEMAT (1993) by multiplying the estimates of timber harvest by the number of jobs per thousand board feet. We assumed no offsetting increases in harvests from non-Federal lands. Initial estimates of the average annual timber harvest for each ERU were projected for the next decade using the Columbia River Basin

SUccession Model (CRBSUM).[10] We used the midpoints of the Federal timber harvests estimated by the EIS team (based on the data in table 5.2) for each alternative.

The direct employment multiplier, or number of jobs per thousand board feet, was determined by dividing current employment in the wood and forest products industry [Standard Industrial Code (SIC) 24] by current timber harvest. The number of forestry workers (SIC 08) required for the precommercial thinning assumed in the CRBSUM model runs was estimated using 30 jobs per $1 million of labor expenditures.[11] As in the FEMAT approach, we assumed no job changes for the pulp and paper industry (SIC 26) because this sector would not be directly affected by change in timber harvest from FS- and BLM-administered lands.

To put these timber job impacts in perspective, it should be noted that the variability among alternatives is within the range of recent industry changes. Jobs attributable to total timber harvest and from FS- and BLM-administered lands are shown in the following tabulation:

	EEIS		UCRB	
Year	Total	Federal	Total	Federal
	- - - - - - - - - Thousands - - - - - - - - - -			
1982	16.5	7.4	18.2	5.7
1986	20.5	12.1	21.2	7.8
1990	23.1	11.3	21.8	7.7
1993	21.2	7.5	21.0	5.6

For several reasons, we are not sure that the timber harvest levels estimated for the preliminary draft EIS alternatives will be realized. First, some of the timber harvest projected by CRBSUM assumed helicopter logging that at current (Spring, 1996) prices and costs will not likely be sold. This volume could amount to between 9 and 15 percent of the potential sale volume. Consideration may need to be given to other, less costly, logging systems.

A second reason that this timber may not be sold is because of low average harvest diameters. We examined this by subtracting precommercial thinnings from total harvest (because these trees are not taken to mills) and calculating the diameter at breast height (DBH) of the remainder. The resulting average harvest diameters (in inches) are:

	Alternative						
	1	2	3	4	5	6	7
EEIS	8.9	9.3	9.1	9.2	9.1	9.2	NA
UCRB	8.8	9.0	9.3	9.3	9.1	9.4	NA

Given these diameters, many sales will not meet current standards for economic viability in which sales must have at least 40 percent of their volume in sawtimber (12 inches DBH or greater), either green or recently dead. Commercial viability of salvage sales is even more questionable because the value of dead sawtimber drops rapidly, especially for pines. Trees with diameters less than 8 inches are likely to sell only during periods with high chip prices (such as in 1994 and early 1995).

Third, the costs of the management actions assumed in various alternatives may be prohibitive. The precommercial thinning contained in the CRBSUM model runs are extremely costly. Assuming $110 per acre, the annual costs of precommercial thinning for the alternatives are $7.29, $2.98, $4.76, $4.86, $4.81, $4.11, and $0.06 millions of dollars, respectively. Alternative 1 would cost $72.9 million for the first decade.

Managers should not assume that rising stumpage prices will increase revenues sufficiently to cover the costs of such management actions. We do not expect the rapid stumpage price increases of the early 1990s to continue. Rather, for the next few

[10]Steve Rheinberger developed a PARADOX database from volume and stand information sampled from selected CRBSUM pixels throughout the forested areas of the Basin. His assumptions are documented in reports dated November 6, 1995 and March 3, 1996. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

[11]Total expenditures were reduced by 20 percent for non-labor costs.

years prices are expected to increase by 1 to 2 percent per year (in real terms) (Haynes and others 1995). Given the difficulty that the FS and BLM had selling timber early in 1996, agency revenue may be difficult to maintain through timber sales.

Counties—The second question concerning the impacts on economic activity focuses on the effects of changes in Federal land management in various counties in the Basin. Estimating the economic impacts associated with the preliminary draft EIS alternatives is only one step in the process. The next step involves identifying where these impacts might be concentrated, so that eventually the effectiveness of specific actions to mitigate impacts can be assessed. To identify the location of impacts, we focused on the 63 counties in the Basin that the Economic Research Service has classified as "Federal land"—meaning at least 33 percent of their area is managed by federal agencies. We used information from Haynes and Horne (in press) to identify those counties in which activities associated with FS and BLM range, recreation, or timber outputs are important components of the Basin economy. Counties reliant on Federal range were those in which at least 12 percent of total agriculture sales were dependent on forage from Federal lands.[12] For recreation, we used those counties within the Basin identified by Johnson and Beale (1995) as having a significant component of the economy associated with recreation activity. We assumed that impacts would be felt in recreation counties within BEA areas where recreation jobs might change by more than 4 percent. Changes experienced at the BEA level are likely to be most pronounced in recreation counties. We assumed Federal timber harvest levels could affect the economies of counties in which the 29 isolated timber-dependent communities are located (see Haynes and Horne, in press, for details).

Effects—Using assumptions described above, we found that 39 counties may be affected by federal land management actions. Ten of these counties may be affected by decisions regarding grazing on FS- and BLM-administered lands (table 5.3). Given that a maximum difference of 500 range jobs across the entire Basin may result from the alternatives, potential impacts are not likely to be significant except to the economies of the 10 counties reliant on range. These 10 counties share some interesting characteristics. In addition to their reliance on Federal forage, they are sparsely populated, having an average population density of 1.7 people per square mile. Reflecting higher Federal forage use in the UCRB planning area, 8 out of 10 range counties are in the UCRB area. There are two important differences between these counties. First, three counties (Sublette County, Wyoming; and Lemhi and Valley Counties, Idaho) have medium levels of economic resiliency, while the other counties have low economic resiliency. The second important difference is that 4 of these 10 range counties are also classified as recreation counties (Valley and Lemhi Counties, Idaho; and Sublette and Teton Counties, Wyoming). Of these counties, only Teton County, Wyoming has low economic resiliency.

For the 21 recreation counties, jobs associated with recreation activity in 8 may decrease under Alternative 1 compared with Alternative 2 (table 5.4). This is because of the assumption that this alternative would result in less primitive and semi-primitive acres than under Alternative 2. Alternative 5 would result in more modest job decreases, thus only five counties are identified as experiencing a negative impact (Bonner, Kootenai, Benewah, Blaine, and Camas Counties, Idaho). We were unable to estimate job impacts in four counties (Fremont and Sublette Counties, Wyoming; and Humboldt and Elko Counties, Nevada) because they lie outside the BEA areas, the units for which we could calculate effects.

[12]Originally we used 10 percent, but in sorting the counties there was a natural break between 10 and 12 percent reliance. Three counties (Ferry County, Washington; and Wallowa and Lake Counties, Oregon) were greater than 10 percent but fell just below the break in data. Given the number of prospective job losses, we decided to focus on fewer rather than more counties.

Table 5.2 — Timber harvest in the Basin[1] by ecological reporting unit (ERU), EIS planning area (EEIS, UCRB), preliminary draft EIS alternatives (1 through 6),[2] and annual average 1995 to 2005.

Area[3]	Alternative					
	1	2	3	4	5	6
	Million cubic feet					
Northern Cascades	33.99	10.90	21.05	20.89	20.24	18.83
EEIS	33.99	10.90	21.05	20.89	20.24	18.83
UCRB	0	0	0	0	0	0
Southern Cascades	48.22	35.18	22.00	21.70	25.06	21.42
EEIS	48.22	35.18	22.00	21.70	25.06	21.42
UCRB	0	0	0	0	0	0
Upper Klamath	51.48	30.85	27.43	27.63	27.63	27.38
EEIS	51.48	30.85	27.43	27.63	27.63	27.38
UCRB	0	0	0	0	0	0
Northern Great Basin	33.72	20.24	13.72	13.87	13.87	14.23
EEIS	33.72	20.24	13.72	13.87	13.87	14.23
UCRB	0	0	0	0	0	0
Columbia Plateau	31.15	14.62	17.34	17.48	18.20	15.58
EEIS	25.17	12.81	14.78	14.90	15.57	13.22
UCRB	5.98	1.81	2.56	2.580	2.63	2.36
Blue Mountains	84.16	48.34	36.89	37.46	37.59	36.39
EEIS	82.48	47.96	36.04	36.54	36.76	35.67
UCRB	1.68	0.38	0.85	0.92	0.83	0.72
Northern Glaciated Mountains	179.12	113.95	94.23	67.90	129.36	62.10
EEIS	48.88	34.43	20.73	17.98	30.96	15.79
UCRB	130.24	79.52	73.50	49.92	98.40	46.31
Lower Clark Fork	150.67	61.80	96.77	63.60	105.79	60.92
EEIS	0	0	0	0	0	0
UCRB	150.67	61.80	96.77	63.60	105.79	60.92
Upper Clark Fork	25.42	11.34	13.38	13.59	12.62	9.96
EEIS	0	0	0	0	0	0
UCRB	25.42	11.34	13.38	13.59	12.62	9.96
Owyhee Uplands	0.55	0.37	0.39	0.39	0.39	0.35
EEIS	0.20	0.24	0.08	0.08	0.08	0.08
UCRB	0.35	0.13	0.31	0.31	0.31	0.27
Upper Snake	0.50	0.04	0.07	0.07	0.06	0.20
EEIS	0	0	0	0	0	0
UCRB	0.50	0.04	0.07	0.07	0.06	0.20
Snake Headwaters	1.53	0.27	0.59	0.66	0.60	0.49
EEIS	0	0	0	0	0	0
UCRB	1.53	0.27	0.59	0.66	0.60	0.49
Central Idaho Mountains	152.08	47.37	56.36	58.54	50.89	48.55
EEIS	0	0.11	0.03	0.03	0.03	0
UCRB	152.08	47.26	56.33	58.51	50.86	48.55
Total	792.59	395.27	400.22	343.78	442.30	316.40
EEIS	324.14	192.72	155.86	153.62	170.20	146.62
UCRB	468.45	202.55	244.36	190.16	272.10	169.78

[1] The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those portions of the Klamath River basin and the Great Basin in Oregon.

[2] Alternative 7 is not included in this table because there is no timber harvest activity under that alternative.

[3] Area: EEIS - Eastern Oregon and Washington planning area; UCRB - Upper Columbia River Basin planning area.

Table 5.3 — Economic evaluation of the preliminary draft EIS alternatives for their effects in 13 counties reliant on Federal forage within the Basin.[1]

County	Alternative 1	2	3	4	5	6	7
Custer, ID	0	0	0	0	0	0	–
Sublette, WY	0	0	0	0	0	0	–
Adams, ID	0	0	0	0	0	0	–
Teton, WY	0	0	0	0	0	0	–
Harney, OR	0	0	0	0	0	0	–
Lemhi, ID	0	0	0	0	0	0	–
Valley, ID	0	0	0	0	0	0	–
Camas, ID	0	0	0	0	0	0	–
Grant, OR	0	0	0	0	0	0	–
Owyhee, ID	0	0	0	0	0	0	–
Wallowa, OR	0	0	0	0	0	0	0
Ferry, WA	0	0	0	0	0	0	0
Lake, OR	0	0	0	0	0	0	0

0 = No Change; – = Negative Impact; + = Positive Impact

[1]The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those portions of the Klamath River basin and the Great Basin in Oregon.

Assumptions:
(1) The bulk of the impacts are assumed to affect counties in the UCRB, as 74% of the Federal AUMs are there.
(2) Alternative 1 represents a continuation of activity levels, standards, and guidelines from the late 1980s.
(3) Alternative 2 represents a continuation of current (1994, 1995) levels and interim directions.

As mentioned previously, four recreation counties are also identified as reliant on Federal range. This suggests a possible complementary relation between ranching and recreation, as ranching can provide attractive settings in keeping with the western image. None of the identified timber-reliant counties are also classified as recreation counties.

We identified 16 counties in which the 29 timber-dependent communities are located: 8 counties have 1 timber-dependent community; 5 have 2 dependent communities; 1 has 3 dependent communities (Lincoln County, Montana); and, 2 have 4 dependent communities (Idaho County, Idaho; and Grant County, Oregon). The economic impacts are shown by county in table 5.5. Alternatives 4, 6, and 7 would have negative impacts on between 9 and 11 counties, most of which are in the EEIS area. The more modest timber reductions assumed under Alternatives 3 and 5 suggest more mixed results, with an increase in timber jobs in one-third of the counties, all of which are in the UCRB EIS area. We found reduced impacts either because of minor changes in Federal timber harvest levels (for example, in the Northern Glaciated Mountains ERU) or because some area mills have greater access to timber from private timberlands.

Economic resiliency—The third type of impact is the effect of changes in Federal land management on economic resiliency. In Haynes and Horne (in press), economic resiliency is defined in terms of economic diversity—the greater the diversity of economic sectors, the higher the economic resiliency. Greg Alward computed the basic indexes from diversity of employment data.[13] We divided the diversity indices into three

[13]Personal communication. 1995. Greg Alward, Land Management Planning Staff, U.S. Forest Service, Fort Collins, CO. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

categories, such that a third of the counties in the United States fell into each group: low diversity (0-70), medium diversity (71-77), and high diversity (78-100). Using the ranges established in this manner, we assigned ratings for the economic resiliency of each of the 100 counties in the Basin. We examined economic resiliency of the Basin in two ways: (1) weighted by its population, and (2) weighted by land area (see fig. 5.1). To judge the effects of the preliminary draft EIS alternatives, we used the population weighted measure of economic resiliency because it varied directly with population levels and attributes.

<u>Effects</u>—In general, the economic resiliency of the Basin is high relative to other parts of the United States, although it varies across different subregions in the Basin due in part to the size of the area and diversity of existing biophysical conditions. In figure 5.1, the bar chart on the left shows economic resiliency weighted by population. It shows that 53 percent of the human population lives in counties with high economic resiliency. The bar chart on the right of figure 5.1 shows resiliency weighted by area; it shows that 55 percent of the land area of the Basin has low economic resiliency. The 53 percent of the population that enjoys high economic resiliency lives on 15 percent of the Basin's area (fig. 5.1).

Table 5.4 — Economic evaluation of the preliminary draft EIS alternatives for their effects in counties identified as recreation counties by Johnson and Beale (1995).

	Alternative						
County	1	2	3	4	5	6	7
Bonner, ID	–	0	0	0	–	0	0
Kootenai, ID	–	0	0	0	–	0	0
Benewah, ID	–	0	0	0	–	0	0
Flathead, MT	0	0	0	0	0	0	0
Teton, ID	–	0	0	0	0	0	0
Lemhi, ID	–	0	0	0	0	0	0
Teton, WY	–	0	0	0	0	0	0
Blaine, ID	–	0	0	0	–	0	0
Valley, ID	0	0	0	0	0	0	0
Hood River, OR	0	0	0	0	0	0	0
Deschutes, OR	0	0	0	0	0	0	0
Wasco, OR	0	0	0	0	0	0	0
Lewis and Clark, MT	0	0	0	0	0	0	0
Fremont, ID	NA	NA	NA	NA	NA	NA	NA
Sublette, WY	NA	NA	NA	NA	NA	NA	NA
Okanogan, WA	0	0	0	0	0	0	0
Chelan, WA	0	0	0	0	0	0	0
Custer, ID	–	0	0	0	0	0	0
Elko, NV	NA	NA	NA	NA	NA	NA	NA
Humboldt, NV	NA	NA	NA	NA	NA	NA	NA
Camas, ID	0	0	0	0	–	0	0

0 = No Change; – = Negative Impact; + = Positive Impact; NA = Not Available

<u>Assumptions:</u>
(1) If BEA area experiences + 100 jobs, consider impact significant.
(2) Alternative 1 represents a continuation of activity levels, standards, and guidelines from the late 1980s.
(3) Alternative 2 represents a continuation of current (1994, 1995) levels and interim directions.

The employment diversity indexes for 1991 that were used as measures of economic resiliency by BEA area are:

BEA area	Diversity index
Boise, ID	0.94
Butte, MT	0.88
Idaho Falls, ID	0.92
Missoula, MT	0.92
Pendleton, OR	0.91
Redmond-Bend, OR	0.92
Spokane, WA	0.94
Tri-Cities, WA	0.92
Twin Falls, ID	0.91

These results indicate that the regional economies within the Basin are diverse (the highest possible score is 1.0), and consequently have high economic resiliency. Little variation in economic diversity is found across the Basin at the scale of BEA areas. These relatively high indexes reflect the consequence of rapid economic growth in the Basin since the mid 1980s. Furthermore, the economy of the Basin has shown resistance to national recessions except when they greatly affect the agricultural sector.

The highest diversity ratings are in BEA areas containing metropolitan counties (for example, counties containing Boise, Idaho; and Spokane and Richland, Pasco, Kennewick, Washington). The BEA economies in which employment associated with recreation is substantial also have high diversity, suggesting that they have high resilience to fluctuations in recreation activity (for example, Idaho Falls, Idaho; Missoula, Montana; and Redmond-Bend, Oregon). The two BEA areas in which timber plays a major role (Redmond-Bend and Pendleton, Oregon) also have fairly diverse economies, suggesting that they are resistant to fluctuations in that industry. The low diversity number for the Butte, Montana BEA area is misleading because diversity is calculated for only that portion of the BEA area lying within the Basin.

Table 5.5 — Economic evaluation of the preliminary draft EIS alternatives for their effects in 16 counties reliant on timber from Federal lands.

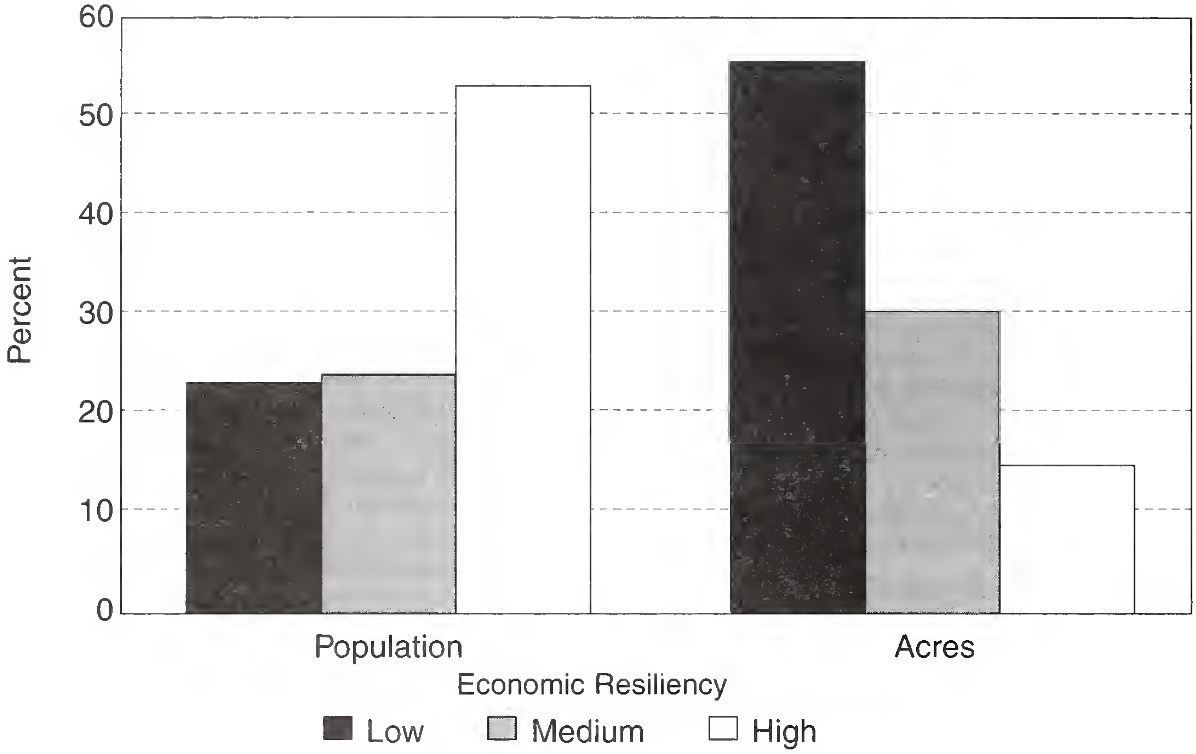
	Alternative						
County	1	2	3	4	5	6	7
Ferry, WA	+	0	–	–	0	–	–
Stevens, WA	+	0	–	–	0	–	–
Pend Orielle, WA	+	0	–	–	0	–	–
Boundary, ID	+	0	0	–	+	–	–
Lincoln, MT	+	0	0	–	+	–	–
Sanders, MT	+	0	+	0	+	0	0
Mineral, MT	+	0	+	0	+	0	0
Missoula, MT	+	0	+	0	+	0	0
Ravolli, MT	+	0	0	0	0	0	–
Idaho, ID	+	0	+	+	0	0	0
Clearwater, ID	+	0	+	0	0	0	–
Adams, ID	+	0	+	+	0	–	0
Grant, OR	+	0	–	–	–	–	–
Morrow, OR	+	0	–	–	0	0	–
Lake, OR	+	0	–	–	–	–	–
Harney, OR	+	0	–	–	–	–	–

0 = No Change; – = Negative Impact; + = Positive Impact

Assumptions:

(1) Counties with timber dependent communities were assigned to ERUs to take advantage of ERU-specific timber harvest numbers.
(2) Alternative 7 was evaluated at 60 percent of Alternative 3.
(3) Alternative 1 represents a continuation of activity levels, standards, and guidelines from the late 1980s.
(4) Alternative 2 represents a continuation of current (1994, 1995) levels and interim directions.

Figure 5.1 — Economic resiliency of 100 counties within the Basin, weighted by population and by land area.



The size of an area over which economic diversity is measured is important. The larger the area considered, the greater the economic diversity and expected economic resiliency, especially if it includes a large metropolitan area that serves as a trade center. Neither counties nor communities are considered to be "functional" economies in and of themselves because they do not include enough parts of the economy to constitute a complete system. A multi-county region may be identified as economically strong and resilient, while individual counties may not be. It is difficult to characterize with confidence the economic effects of changing Federal land use on individual counties or communities.

With these caveats in mind, the economic resiliency ratings calculated for the 100 counties in the Basin are shown in map 5.2. The average diversity index for the 100 counties in the Basin is 0.70, slightly lower than the national county average of 0.73. The average county-level diversity is lower than the average diversity (0.80) of the BEA areas in the Basin. The economic resiliency of the 63 "Federal lands" counties varies considerably: 9 are high, 19 are medium, and 35 are low.

Finally, we caution against concluding that low to high ratings are equivalent to bad or good ratings; the intent is to describe the adaptability or vulnerability of these counties, not to rate them as good or bad. Generally, most of the people in the Basin (82%) live in counties that are medium or high in their degree of adaptability, as measured by economic resiliency. Most of the land area (68%) in the Basin, however, is in the low category for economic resiliency.

We used the following rule set to identify those counties in which FS and BLM decisions resulting

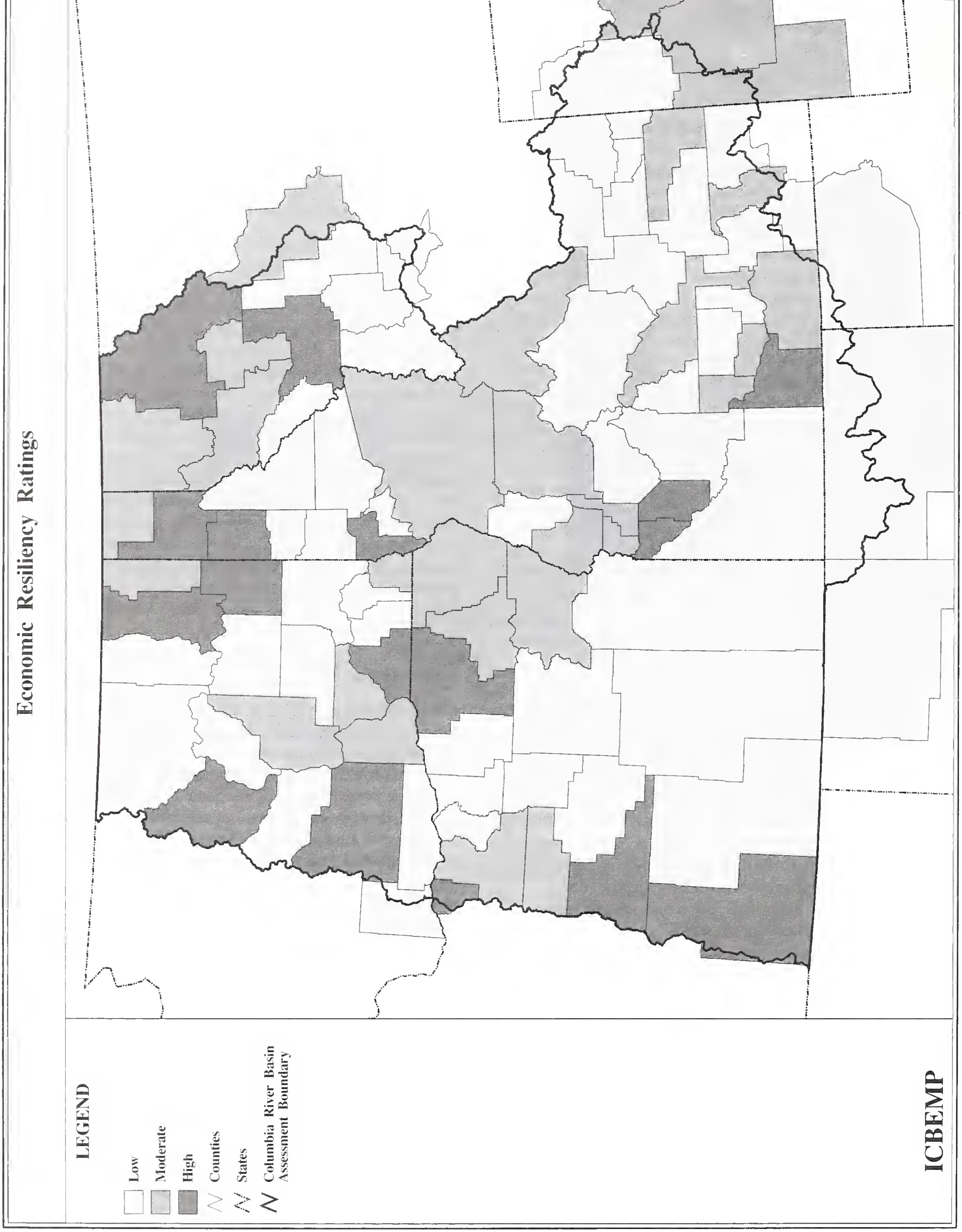
from the Interior Columbia Basin Ecosystem Management Project (ICBEMP) may affect economic resiliency. We considered (1) those Federal land counties in which the percent of agricultural sales dependent on Federal forage was greater than 12 percent, (2) counties with low economic resiliency that were defined as recreation counties, and (3) counties with two or more timber dependent communities. Using these rules, we identified 17 counties whose economic resiliency might be affected by the preliminary draft EIS alternatives (table 5.6). The impacts of the alternatives varied depending on the number and type of sectors affected and the number of timber-dependent communities in the counties. Two counties may experience reduced economic resiliency under Alternatives 2 through 7 (Grant and Lake Counties, Oregon). The population of these two counties is 15,104 individuals, or 0.5 percent of the population in the Basin. Ferry County, Washington may experience reduced economic resiliency under Alternatives 3, 4, 6, and 7. Lincoln County, Montana may experience negative impacts under Alternatives 4, 6, and 7. Adams County, Idaho may experience a negative impact under Alternative 6 only. Because of its greater reductions in cattle grazing, Alternative 7 may reduce the economic resiliency of two additional counties: Harney County, Oregon and Owyhee County, Idaho. The negative effect Alternative 1 has on recreation may adversely affect four counties (Benewah, Custer, and Teton Counties, Idaho; and Teton County, Wyoming).

Uncertainty—These assessments of economic resiliency assume that the counties and BEA areas within the Basin will continue (in the next decade) to experience the economic and demographic patterns of the recent past. We expect that structural changes in the United States economy (for example the growth in the trade and service sectors) and technological changes (for example in telecommunications) will continue to affect economic and social well-being. These changes have allowed individuals greater choices about where and how to live. In the Basin, this freedom has led some people to argue that quality of life will increasingly drive social and economic changes. Our notions of economic resiliency are based on the experience of the past five years, which has been a period of rapid economic growth fueled in part by extensive in-migration.

The future, however, may hold some surprises that will result in different outcomes than were presented in Haynes and Horne (in press). We know, for example, that the Basin has experienced periods of both in-migration and out-migration. In the 1980s, the Basin experienced net out-migration as the United States coped with periods of severe recession, structural changes in the economy that diminished the role of resource based (including agriculture) economies, and booms in selected economic sectors and regions. Such economic downturns may affect the economy in the Basin again, particularly if they have significant impact on the agricultural sector. Despite these risks, history has shown that humans are the most adaptive creatures in the Basin's ecosystems. Faced with risks, they will continue to adapt and demand ecosystem goods and services from FS- and BLM-administered lands in the Basin.

Economic Efficiency

Our evaluation of economic efficiency examines the value of outputs that society derives from FS- and BLM-administered lands in the Basin. While "outputs" could be defined as including a wide array of ecosystem goods, functions, and conditions desired by society, because of limited data we were able to include only four specific outputs in this analysis: range, recreation, timber, and unroaded areas. To perform this evaluation, we developed a series of assumptions. All of our calculations are for the year 2005. Range, recreation, and timber values are placed on the site at which they are used, thus they are "on forest" (National Forest) or "on BLM district." All values were taken from the 1990 Resource Planning Area (RPA) (USDA 1990), inflated to 1994 dollars, then indexed to real price in 2005 (table 5.7). For range, we used AUM numbers calculated for each alternative. The value for range includes both its value as forage, and consumer surplus.



Map 5.2 — Map showing economic resiliency ratings calculated for 100 counties within the Basin.

Table 5.6 — Economic evaluation of the preliminary draft EIS alternatives on economic resiliency of selected counties in the Basin.[1]

County	Alternative 1	2	3	4	5	6	7
Ferry, WA	0	0	–	–	0	–	–
Lincoln, MT	0	0	0	–	0	–	–
Mineral, MT	0	0	0	0	0	0	0
Ravolli, MT	0	0	0	0	0	0	0
Clearwater, ID	0	0	0	0	0	0	0
Adams, ID	0	0	0	0	0	–	0
Grant, OR	0	–	–	–	–	–	–
Morrow, OR	0	0	0	0	0	0	0
Lake, OR	0	–	–	–	–	–	–
Harney, OR	0	0	0	0	0	0	–
Custer, ID	–	0	0	0	0	0	0
Adams, WA	0	0	0	0	0	0	0
Teton, WY	–	0	0	0	0	0	0
Camas, ID	0	0	0	0	0	0	0
Owyhee, ID	0	0	0	0	0	0	–
Benewah, ID	–	0	0	0	0	0	0
Teton, ID	–	0	0	0	0	0	0

0 = No Change; – = Negative Impact; + = Positive Impact

[1]The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those portions of the Klamath River basin and the Great Basin in Oregon.

Rule set for determining identified inputs on economic resiliency.
(1) Counties with two or more timber-dependent communities.
(2) Counties with grazing dependency of more than 12 percent.
(3) Nontimber and grazing-dependent counties with low economic resiliency, low population density, and not designated as a recreation county.

Assumptions:
1) Alternative 1 represents a continuation of activity levels, standards, and guidelines from the late 1980s.
2) Alternative 2 represents a continuation of current (1994, 1995) levels and interim directions.

For recreation, we evaluated the preliminary draft EIS alternatives based on their effect on the number of acres in various ROS classes. We assumed that the people recreating in the Basin live in seven northwestern states (Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming). We used standard projections of population and their characteristics in these states for the year 2005 (U.S. Department of Commerce 1990). We used a model to project recreation activity (Haynes and Horne, in press). Coefficients were tailored to replicate behavior of residents of the Northwest (Hospodarsky 1989). We used recreation values developed for the 1990 RPA (USDA 1990) which show differences depending on where in the Basin the recreation activity occurs, and higher values for some activities taking place in unroaded areas.

For timber, we used projections of timber harvest shown in table 5.2. Timber values depicted in table 5.8 reflect volume-weighted averages of prices paid for timber harvested from National Forests in each ERU.

We assumed changes in unroaded areas in each ERU were in direct proportion to the existing ratio between primitive/semi-primitive acres and unroaded acres. Value, in this case, refers to what

Table 5.7 — Willingness-to-pay values[1] in the year 2005 for range and recreation outputs by Basin ecological reporting unit (ERU).

Output	ERU 1-6	ERU 7-9	ERU 10-13
	1994 dollars		
Range (per AUM)[2]	9.25	9.25	9.25
Recreation (per person activity day)[3]			
Camping	9.36	6.50	7.32
Day use	9.36	6.50	7.32
Fishing	61.47	42.66	42.35
Hunting	47.65	49.71	48.65
Motor boating	2.46	2.46	6.16
Motor viewing	4.88	4.12	3.40
Nonmotorized boating	3.70	9.85	8.62
Off-road vehicle use	4.88	4.12	3.40
Snowmobiling	4.83	4.08	3.36
Trail use	7.43	7.05	6.94
Viewing wildlife	32.10	30.71	31.55
Winter sports	40.66	40.66	40.66
Wilderness[4]	44.16	31.55	31.55

Source: 1989 RPA unless otherwise noted, inflated to 1994 dollars using consumer price index.

[1]All willingness-to-pay values are determined "on forest" (National Forest) and do not include other production costs associated with the activity.

[2]Personal communication. 1995. Linda Langer, U.S. Forest Service Economist, Washington, D.C. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362. Inflated from 1993 dollars using producer price index.

[3]Source: USDA 1990, inflated from 1989 to 1994 dollars using consumer price index. An "activity day" is the average amount of time spent during 24 hours pursuing that activity. These values include fees, but exclude expenditures that represent a cost of production, such as travel costs.

[4]Value when camping, day use, nonmotorized boating, or trail use takes place in wilderness area.

people are willing to pay for unroaded areas to simply exist. This value is separate from that of recreation in unroaded areas, which is included in the recreation value. Using the value of unroaded areas as described in studies by Walsh and others (1984), and Pope and Jones (1990) (in Haynes and Horne, in press), we assumed that households are willing to pay $40 per year for the 5.8 million unroaded hectares (14.3 million acres) in the Basin. In this evaluation we were requested to make an additional assumption that undesignated, unroaded areas are half the value of designated wilderness areas.[14] We then multiplied that value by the 116 million households expected to exist in the United States in the year 2005 (USDA 1990). We used the number of U.S. households because unroaded areas are a classic public good and demand is properly viewed from the national scale.

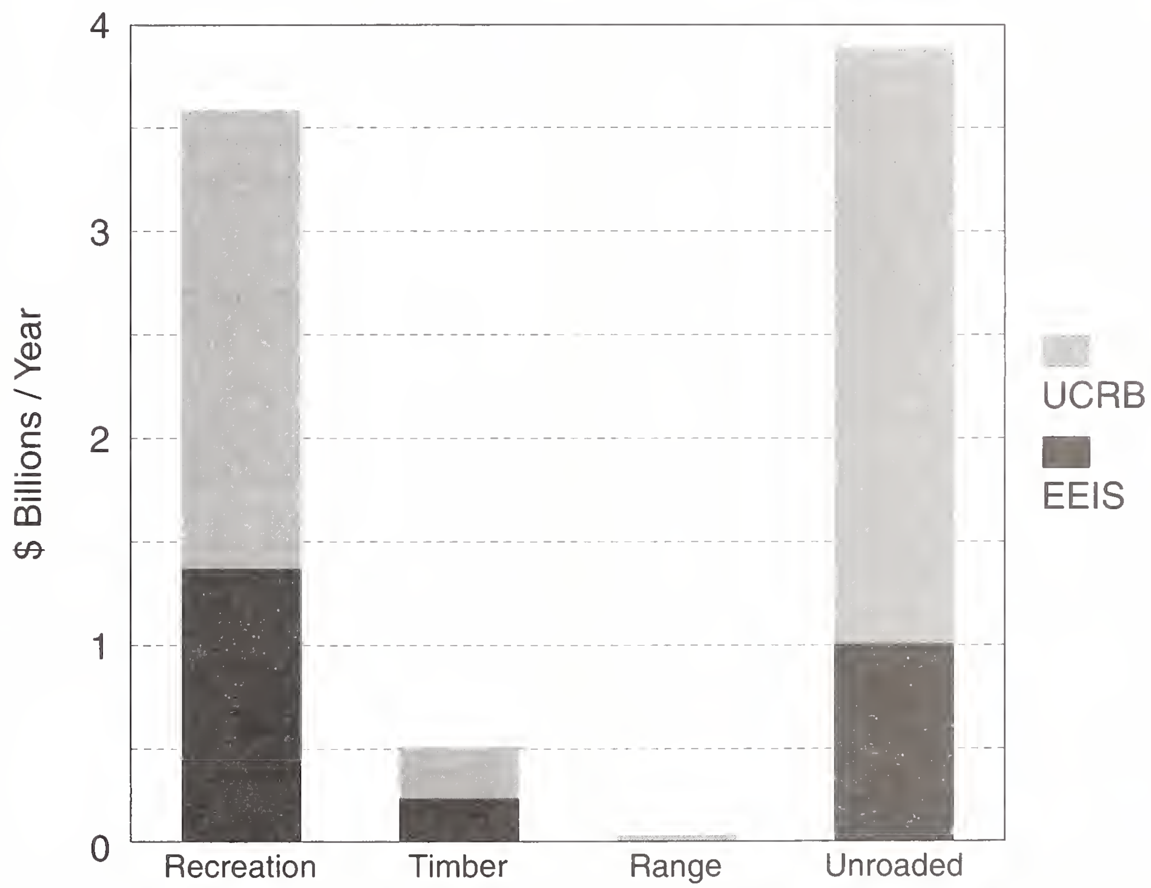
Effects—Using these assumptions, we calculated the value to society of the four outputs from the FS- and BLM-administered lands in the Basin. This calculation is not without controversy in that it involves the different notions of value and the effectiveness of expressing different types of values (such as market, non-market, and existence values) in dollar denominated units. In keeping with the principles of economic welfare analysis, we included as many sources of value provided to society by these lands as possible (Field 1994,

[14]Designated wilderness in the UCRB and EEIS planning areas are 56 and 90 percent of the unroaded areas, respectively.

Krutilla and Haigh 1978). In an economic sense, an examination of the full array of ecosystem management benefits requires a conscious attempt to place value on intangible benefits. The outputs discussed here are the only ones for which we had both output measures and values.

In the EEIS planning area (fig. 5.2), recreation ranks highest in value, followed (in order) by unroaded areas, timber, and range. In the UCRB planning area (fig. 5.2), the ranking of outputs, from highest to lowest is unroaded areas, recreation, timber, and range. The value of unroaded areas can be viewed as a proxy for the unroaded character and the species composition, "old-growth" forest, and other ecosystem characteristics that people associate with such areas. These rankings explain what lies at the heart of the economic-choice question concerning the consequences of FS and BLM land management in the Basin: while the values of recreation and unroaded areas are not expressed in the marketplace, they exceed those of range and timber. These findings are consistent with other studies (for example, Haynes and others 1992). The 1990 RPA found for FS-administered lands that while "timber and minerals benefits dominate the receipts... recreation and wildlife and fish program benefits dominate the market-

Figure 5.2 — Partial net economic benefit of continuation of current, year 2005, in the EEIS and UCRB planning areas.



clearing price benefits" (USDA 1990). This calculation did not include the benefits or existence value of unroaded areas, as does our analysis. It is unlikely that addressing the controversial details of the methods used to derive these numbers would change the relative rankings we found. The significance of this information is that in the big picture, the non-market outputs from the FS- and BLM-administered lands in the Basin provide more benefits than do the market outputs. Regarding the preliminary draft EIS alternatives, if decision makers explicitly acknowledge the relative importance of the various outputs provided society by these lands, then management plans may become more socially acceptable.

When compared to Alternative 2, overall net economic value is little affected by any alternative, increasing at most by 5 percent (under Alternative 1) and decreasing no more than 3 percent (under Alternative 7) (table 5.9). Net economic value is calculated as the sum of the values of range, recreation, timber, and unroaded areas—an admittedly partial accounting. For the EEIS area, Alternatives 3 through 7 would represent a loss to society of $33 to $136 million per year, or 1 to 5 percent of the value provided by these FS- and BLM-administered lands. For the UCRB area, at one extreme Alternative 3 represents a gain of $48 million per year (1 percent), while at the other Alternative 7 represents a loss in value of $83 million per year or 2 percent of the value provided by these FS- and BLM-administered lands. To choose any alternative with a negative change, decision makers would have to determine that either they preferred the distributional effects, or that the gain from unquantified and unvalued outputs of ecosystem management were at least equal to the losses. Examples of such unquantified and unvalued outputs include stronger fish populations, acres of old-growth, improved water quality, reduced flooding, reduced risk of fire, or improved ecosystem health.

Table 5.8 — Willingness-to-pay values in the year 2005 for timber, by Basin ecological reporting unit (ERU), using 1994[1] dollars.

Ecological Reporting Unit	Timber[2]
	Dollars per MBF
Northern Cascades	148
Southern Cascades	130
Upper Klamath	440
Northern Great Basin	262
Columbia Plateau	370
Blue Mountains	232
Northern Glaciated Mountains	226
Lower Clark Fork	178
Upper Clark Fork	136
Owyhee Uplands	14
Upper Snake	58
Snake Headwaters	62
Central Idaho Mountains	444

[1]Personal communication. 1995. Richard Haynes, Economist, USDA, Forest Service, Pacific Northwest Research Station, Portland, OR 97208.

[2]Willingness-to-pay is calculated by adding stumpage price and consumer surplus (estimated as 10% of stumpage price).

Most of the change in net economic value between alternatives is due to different timber values, $5 million to $556 million higher in Alternatives 1, 3, and 5; $48 million to $199 million lower in Alternatives 4, 6, and 7. In Alternatives 1 and 5, increased timber values are at the expense of $71 million to $131 million in recreation values, and $4 million to $7 million in unroaded areas. The value of range is most significantly affected by Alternative 2 in which it is reduced by $10 million per year.

In the EEIS area, overall net economic values are lower in Alternatives 3 through 7 primarily because timber values are reduced by $27 million to $123 million. Recreation values decrease by $4 million and $5 million in Alternatives 1 and 5, respectively. The value of range is reduced by $3 million in Alternative 7, and the value of unroaded areas is reduced by $2 million and $1 million in Alternatives 1 and 5 respectively.

In the UCRB area, Alternatives 1, 3, and 5 increase net economic value relative to Alternative 2 by $4 million to $256 million, while Alternatives 4, 6, and 7 decrease value from $3 million to $83 million. The patterns for range, recreation, timber, and unroaded are similar to those for the Basin as a whole.

Table 5.9 — Net economic value of alternatives in the year 2005 for range, recreation, timber, and unroaded areas, for total Basin, EEIS, and UCRB.

	Alternative 1	2	3	4	5	6	7
	Millions of dollars per year						
Basin	8,373	7,955	7,960	7,907	7,926	7,867	7,746
Range	24	24	24	24	26	24	13
Recreation	3,434	3,565	3,565	3,565	3,494	3,565	3,565
Timber	1,061	505	510	457	550	417	306
Unroaded	3,854	3,861	3,861	3,861	3,857	3,861	3,861
EEIS	2,747	2,585	2,542	2,540	2,552	2,531	2,459
Range	6	6	6	6	7	6	3
Recreation	1,322	1,326	1,326	1,326	1,321	1,326	1,326
Timber	441	244	201	199	217	190	121
Unroaded	1,007	1,009	1,009	1,009	1,008	1,009	1,009
UCRB	5,626	5,370	5,418	5,367	5,374	5,335	5,287
Range	18	17	18	17	19	17	10
Recreation	2,111	2,239	2,239	2,239	2,173	2,239	2,239
Timber	650	261	309	258	333	227	186
Unroaded	2,847	2,852	2,852	2,852	2,849	2,852	2,852

Equity

The benefits derived from FS- and BLM-administered lands in the Basin are distributed widely—to people living inside and outside the Basin, the rich and poor, and blue-collar workers and professional managers. Alternatives 4, 6, and 7 would reduce the benefits to consumers of timber products from Alternative 2. Alternative 7 would slightly reduce the value of cattle grazing on FS- and BLM-administered lands in the Basin. Alternatives 1 and 5 also would decrease benefits to recreationists overall, but some of the recreationists would gain while others would lose. In the EEIS area, the road assumptions suggest that Alternatives 1 and 5 would increase benefits to anglers and increase benefits to day and trail users (see table 5.10). This has to do with roads and access, but it does not include feedbacks between road building and levels of fish populations. In the UCRB area (table 5.10), the impacts on recreationists would be more complex. The overall decrease in recreation benefits would include increased benefits to anglers, hunters, and motor viewers under Alternatives 1 and 5. The recreationists that would lose from Alternatives 1 and 5 would be campers, skiers, and day and trail users.

Summary

Regarding economic development, the effects of the preliminary draft EIS alternatives on jobs Basin-wide would be within 1 percent of those resulting from FS- and BLM-administered lands under continuation of current management. As a percent of all jobs in the Basin, the impact would be 0.1 percent. Alternatives 1 and 5 would decrease Basin-wide employment in jobs resulting from recreation activity by 0.5 percent and 0.25 percent respectively of the total current Basin employment. Under Alternatives 1 and 5, in the EEIS area, the increase in timber employment would be offset by losses in recreation employment. Under Alternatives 3, 4, 6, and 7, timber jobs are reduced with no offsetting gains in recreation. Jobs associated with recreation activity do tend to pay less than timber jobs, but economic indicators of recreation counties are stronger than those of manufacturing counties (Haynes and Horne, in press).

Table 5.10 — Change in net economic value of recreation by activity, from Alternative 2 to Alternatives 1 and 5.

Area/Alternative	Camping	Day use	Fishing	Hunting	Motor viewing	Trial use	Viewing wildlife	Winter sports
	Millions of dollars per year							
Basin								
1	-38.98	-87.07	110.83	30.38	12.63	-89.63	-3.24	-71.26
5	-23.84	-54.40	62.96	16.85	7.71	-48.19	-0.48	-34.89
EEIS								
1	-6.00	-11.13	21.98	2.67	2.17	-11.14	1.82	-5.62
5	-5.30	-9.59	18.32	2.07	1.50	-9.74	1.73	-5.25
UCRB								
1	-32.98	-75.94	88.85	27.71	10.46	-78.49	-5.06	-65.65
5	-18.54	-44.81	44.64	14.78	6.20	-38.45	-2.21	-29.64

Ten counties might experience negative effects from the range management direction proposed under Alternative 7, but not from the other alternatives. Twenty-one counties might experience negative economic effects from road management decisions under Alternatives 1 and 5 through their impact on recreation activity. Four of these counties are among the 10 range counties. All 16 timber counties might experience negative impacts on their timber sector with the exception of Alternatives 1 and 5. Combining this information with measures of economic resiliency, we found two counties (Grant and Lake Counties, Oregon) whose economies may experience impacts from these alternatives; about 0.5 percent of the Basin population lives in these two counties.

Given these numbers, it is difficult to argue that FS and BLM decisions broadly affect economic development in the Basin. Rather, the effects are more limited and local in nature. For most people in the Basin, expansion in other economic sectors means that the impact of FS and BLM decisions on their employment and income will be negligible. If the agencies wish to minimize their impact on economic resiliency, they can focus attention on their actions in the two identified counties.

The conclusions from the economic welfare analysis are quite different. The FS- and BLM-administered lands provide society with greater benefits from recreation and the existence of unroaded areas than from their production of timber and cattle forage. Yet, at the margin, most of the impact under all of the alternatives would involve reduced timber production. From this standpoint, to justify choosing any alternative that generates fewer benefits relative to Alternative 2 (continuation of current), decision makers would have to prefer their distributional effects, or believe that the value of the ecosystem outputs gained under these alternatives that are not included in the analysis are worth at least $33 to $136 million per year in the EEIS area, and $3 to $83 million per year in the UCRB area. Examples of such outputs include fish populations, "old-growth" forests, water quality, risk of wildfires and floods, and ecosystem health.

As best we can determine, the effects on people who recreate in the Basin, who value the existence of unroaded areas, and who consume cattle raised on BLM- and FS-administered lands will be minor. Purchasers of lumber products will experience only minor changes in the price of lumber products. The most significant negative effects will be experienced by people employed by the timber industry in the Basin. It is hard to say how long they will experience these impacts, but given compensating increases in harvests from private land and the pace of recent economic growth these transitions should be short lived.

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CHAPTER 6

An Estimate of the Social Consequences of Alternatives in the Eastside and Upper Columbia River Basin Preliminary Draft Environmental Impact Statements

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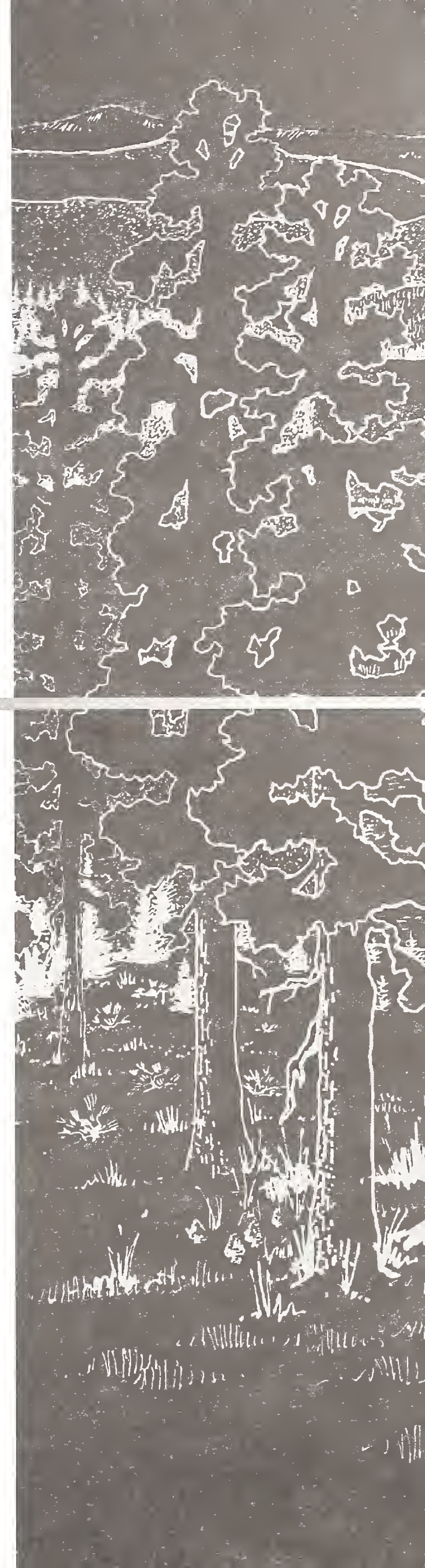

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Introduction

The Interior Columbia Basin Ecosystem Management Project (ICBEMP) is a combined science and management effort of the Forest Service (FS) and Bureau of Land Management (BLM). The project developed two large-scale Environmental Impact Statements (EISs) in two planning areas called the Eastside (EEIS) and Upper Columbia River Basin (UCRB). The Eastside area covers lands administered by the Forest Service or BLM in eastern Oregon and Washington, while the UCRB area covers lands in nearly all of Idaho, western Montana, and small portions of adjacent states. The EISs were written in response to a variety of complex and controversial situations on these federally administered lands, including declines in forest health, increasing scarcity of anadromous and inland cold-water fisheries, rangeland reform, increasing risk of catastrophic fire, and the social and economic consequences of these conditions. The EISs describe seven alternatives, five of which are approaches to implementing ecosystem management.

The project's Science Integration Team (SIT) evaluated the consequences of these alrernatives as defined in the *Preliminary Draft Environmental Impact Statements* (EISs) (USDA, USDI 1996a, 1996b).[1] The ICBEMP contracted with The Bolle Center for People and Forests, University of Montana, to conduct an evaluation of the social consequences of the alternatives. The contract report, available to the public as part of the project record,[2] begins by discussing the framework used to assess social consequences, followed by the criteria used to evaluate the alternatives and a description of the panel process conducted for the evaluation. An overview of the panels' conclusions provides context for interpreting their comments. The main section of the report is the evaluation of consequences, organized by the evaluation criteria. A short conclusions section provides direction for future efforts. In addition, the report contains detailed descriptions of the panel process, notes taken during the panels, workbooks completed by panelists, and written information provided panelists to help guide their judgments. Most of the information in this chapter is extracted from that report.

The Bolle Center report's authors state that readers should be aware that their discussion of social consequences should be considered preliminary because little of the information essential in predicting social consequences was available at the time of their involvement. Additional information on impacts and outputs from the other SIT evaluations of alternatives (economics, terrestrial, aquatics, landscape ecology) would be needed before changes in those systems could be translated into effects on people and social systems. Even with the availability of additional information, however, estimating the effects of the alternatives on people and social systems was hampered by lack of information on how, when, where, and by whom ecosystem management activities on public lands would take place. The ICBEMP's large scope and scale, in addition to the programmatic nature of the decisions to be made, prevented accurate estimation of many effects that are commonly addressed in social impact assessments at smaller scales of analysis. Public comment on the project's Draft EISs[3] should provide additional insight and data on peoples' expectations and perceptions regarding likely social effects.

[1]Analysis of the seven alternatives is based on the definitions found in the preliminary draft version of the Environmental Impact Statements (February 1996). Detailed information cited in this chapter pertaining to the *Preliminary Draft EISs* is reproduced in appendix I of this document.

[2]The Bolle Center for People and Forests contract report (Burchfield and others 1996), on file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

[3]The Draft Eastside and Upper Columbia River Basin Environmental Impact Statements are slated to be released to the public for comment in 1997.

The first section of this chapter summarizes methods used to evaluate the social consequences of the alternatives, including the evaluation variables used and the evaluation process (how the social panels explored likely social effects of the alternatives). The second portion of this chapter presents the results organized by evaluation criterion. Suggested strategies for monitoring social effects are also included in each "Results" section.

Methodology

The social evaluation of alternatives was guided by recent literature on social impact assessment and review of major issues confronting BLM- and FS-administered lands within the Basin.[4] While the scientific and technical literature is increasingly extensive, it indicates that social impact assessment processes should use a variety of information sources and consider certain dimensions of human experience. This section describes the framework, criteria, and methods used to evaluate the alternatives.

Evaluation Variables

The literature on large-scale, programmatic, EIS, social evaluation variables could not be described as voluminous. In the limited number of analyses that have been conducted, the evaluation tends to be qualitative and not quantitative because data and modeling techniques, particularly with respect to direct social effects, are not available. The literature, however, does suggest the types of variables that should be evaluated in a broad-scale social impact assessment.

Jakes and Harms (1995) conducted a roundtable to assess the socioeconomic effects of implementing ecosystem management throughout the National Forest system. As part of this exercise, they identified 13 key impact variables, which they grouped into six classes (table 6.1). Roundtable participants also made recommendations for appropriate use of a variety of tools to assess impacts. Focus groups and expert opinion were two methods specifically identified as appropriate or recommended tools for examining all 13 variables listed in table 6.1.

The Forest Ecosystem Management Assessment Team (FEMAT) (1993) examined the consequences of ten management options in response to problems of Pacific Northwest National Forests. The social assessment focused on impacts of the options on communities, American Indians, recreation opportunities, scenery, amenities, and subsistence. A major conclusion of the assessment was that "communities desire stability, predictability and certainty (FEMAT 1993)." In addition, it was reported that "communities feel they are not a part of decisions that affect their well-being; they want agencies to be more responsive to their concerns (FEMAT 1993)." These conclusions point to the need to consider impacts of Federal land management options on community viability and access to federal decision-making processes.

In implementing the recommendations of FEMAT, its accompanying Final Supplemental EIS (FEMAT 1994) also completed an assessment of impacts to the human population. That analysis included quantitative estimates of impacts to timber-based employment, but did not address recreation-based industry employment. Consideration was given to the impacts to communities judged to be at "higher risk" and more likely to "experience unemployment, increased poverty, and social disruption in the absence of assistance." The Final Supplemental EIS also examined impacts to American Indian peoples and cultures, particularly with respect to impacts of disturbance on fisheries and cultural sites.

The Forest Service Economic and Social Analysis Handbook (FSH 1909.17) also identifies a number of variables to be included when assessing social impacts. These variables include lifestyles, attitudes, beliefs and values, social organization (including community stability), population,

[4] The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those portions of the Klamath River basin and the Great Basin in Oregon.

land-use patterns, and civil rights. This handbook also specifies that "the concern is not whether data are quantitative or qualitative in nature but with the direction of the impact (as opposed to the increment)."

Perceptions of the participants in the social panels, as described below, and the literature, and the EIS scoping sessions were used to develop the list of variables used to evaluate the alternatives. The SIT proposed a set of criteria involving communities, recreation and scenery, and quality of life as starting points for discussion of effects. The social panels (described in detail in the next section) validated several criteria, rejected some, and added still others in the development of a final set of variables. This process was conducted specifically to identify the issues considered important to the panelists: (1) effects on small, rural communities and quality of life; (2) effects on predictability of flows of goods and services from public lands; (3) effects on public access to federal decision making; (4) effects on private property; and (5) effects on additional concerns specific to American Indians. The section "Estimates of Social Consequences" discusses each of these variables in greater detail.

Evaluation Process

The principal method used by the Bolle Center to evaluate impacts was the use of panels consisting of members of the public selected to represent the diversity of values and interests potentially affected by the proposed alternatives. In addition, members representing many American Indian tribes with interests in natural resources also formed a panel to examine the alternatives. Two of the panels focused on each of the EIS planning areas [Eastside (EEIS) and Upper Columbia River Basin (UCRB)] and the third panel focused on American Indian issues. The evaluation and discussions of these three panels provided the primary, but not the sole, source of social impacts data.

Panel participants included members of affected public groups, consultants, academic scientists, sociologists, state agency representatives, county commissioners, representatives from various public land management industries, and members of 14 American Indian tribes (see appendix 6-A for a list of panel members).

The panels were designed to provide the Bolle Center with an understanding of the types of

Table 6.1. Types of socioeconomic variables of interest for evaluation when implementing ecosystem management.

Variable Class	Variable
Impacts on the Economy	Employment Economic Health Economic Structure/Activity
Impacts on Recreation and Aesthetics	Recreation/Aesthetics Amenity Values
Impacts on Social and Cultural	Quality of Life Social Vitality/Stability
Impacts on Forest Products	Timber Product Outputs Non-timber Product Outputs
Impacts on Management	Participatory Planning Leadership in Management Economic Efficiency
Impacts on Ecosystem Health and Productivity	Ecosystem Health and Productivity

Source: Jakes and Harms 1995.

social effects likely to result from implementation of the preliminary draft EIS alternatives from the standpoints of a broad range of people and interests who care about the Basin and public land management. Panel members were asked to make individual evaluations regarding the desirability of those anticipated effects, and then to discuss them with other panel members. The intent was not to have panelists reach any type of consensus regarding likely effects or their acceptability, but instead to become better acquainted with a range of attitudes, beliefs, and values regarding the alternatives and their social effects. The resulting discussions, as shown in the Bolle Center report transcripts, provide great insight into peoples' concerns.

Several days prior to convening the panel, participants were provided informational briefings describing the purpose and the need for the EISs, the proposed ICBEMP action, descriptions of each of the seven alternatives, and summaries of additional information. Panelists also were given two chapters from McCool and others (in press) (one dealing with communities, and the other with environmentally-based amenities) that included appropriate scientific literature, and primary and secondary data. They also received primary data on changes in recreation opportunities, road densities, scenic integrity, timber volume, grazing animal unit months (AUMs), and associated jobs for review prior to convening the panel (The Bolle Center report appendices contain the complete set of information provided to panelists; Burchfield and others 1996).

As part of the panel's working process, participants were requested to complete workbooks concerning each of the alternatives; questions were based on the original evaluation criteria. Once each panel commenced, the agenda was modified based on panelists' concerns. They established personal concerns of importance and qualitatively identified an array of potential social impacts, doing their best to identify the range of probable social impacts rather than precisely quantifying them. Issues that panel participants identified as important (for example, access to decision-making processes) tended to be effects that were not easy to quantify.

Two primary assumptions inherent to the panel process were: (1) panelists could understand each alternative and its implications, and (2) budget to implement each alternative would be provided, except for timber harvesting when a flat-line budget assumption was used.

Effects identified in the social analysis of the alternatives have high levels of uncertainty, primarily because the EISs cover a broad geographic scope, yet project implementation that results in specific outcomes would be applied on a local level. Information on implementation was not available, resulting in much uncertainty in panelists' evaluations of individual alternatives. Panelists believed that the methods used to implement the alternative objectives were as critical to understanding social consequences as the objectives themselves.

The SIT recognized that panel participants may have difficulty attaining an understanding of the project subject matter at a level that would enable them fully to judge outcomes given the short period of time allowed. Considering this, the panel process effectively narrowed the scope of concerns into a defined set of issues and provided insight into perceptions and values held by stakeholders. This was considered invaluable to the SIT, which has the final responsibility for judgments on outcomes.

In addition to information from the panel process, the results discussed below were derived from the draft version of the economic and social assessments (Haynes and Horne, in press; McCool and others, in press) in *An Assessment of Ecosystem Components in the Interior Columbia River Basin and Portions of the Klamath and Great Basins* (Quigley and Arbelbide, in press) and data outputs produced from computer simulations of the alternatives dealing with scenic integrity, road density, and recreation opportunities.

Estimates of Social Consequences

This section identifies potential social consequences of the alternatives, both in terms of responses from panelists and through the application of other available information. Potential social consequences are presented via descriptions of each of the evaluation criteria identified by the panels.

Effects on Predictability

The predictability of flows of goods and services resulting from the alternatives is an issue apart from the actual periodic amount of goods and services that would be provided under each alternative. This is an issue for ecosystem management in particular for two main reasons. First, ecosystem management recognizes that limits to predictability exist (Haynes and others 1996); this acknowledgment then raises into question the ability to predict flows of goods and services from those ecosystems accurately. Second, ecosystem management is based on the principle of managing to achieve desired ecosystem conditions, functions, and processes—not to achieve targeted levels of goods and services, which are viewed as byproducts of restoring and maintaining healthy ecosystems. Ecosystem management deals with these issues through adaptive management—continual adjustment of management activities based on newly acquired knowledge. This continual adjustment implies a lack of long-term predictability regarding flows of goods and services, as well as ecosystem conditions.

These, and other factors such as recent wide fluctuations in flows of goods and services, emphasize the importance of predictability as an ecosystem management issue. This is reflected in the purpose and need, issues, and goal statements in the preliminary draft Environmental Impact Statements.

During the ICBEMP, the issue of predictability has been voiced by diverse interests, although the issue is most commonly brought up in the context of timber harvest levels. Past confusions about variables such as annual sale quantity (ASQ), which has been viewed by the Forest Service as a maximum capability but by others as an actual target, have compounded the issue.

Random, fluctuating patterns of outputs and conditions on public lands can pose many social problems not just for industries and their ability to plan and adapt to market conditions, but for workers and others affected. Ranchers who graze cattle on Federal lands have come to view allotments as a property right, suggesting that high levels of predictability come with this right. However, others have suggested that this is not an accurate perception, and that allotments should be more flexible. Recreation industries and visitors are also concerned about predictability. Outfitting and guiding industries depend on Federal management to allow their businesses to continue, both in terms of their ability to use Federal lands as well as the conditions of those lands. Recreational visitors assume that the places they have always visited and cared about on Federal lands will continue to provide the types of experiences they have had in the past, sometimes for generations.

Predictability is also an important concern to American Indians, who have seen subsistence, ritual, and cultural resources dwindle away, and in some cases be eliminated altogether. Panelists representing counties expressed concerns about the predictability of payments to counties through various revenue-sharing programs—money used by local governments to support roads and schools. A lack of predictability in payments to counties, as well as a drop in the actual payment level, has been and will continue to be a problem for those counties that depend on revenue sharing for significant portions of their budgets.

Criteria — There are many ways to address predictability of natural resource flow or availability. The variability in the supply of timber or other resource commodities being extracted from Federal lands is one way to address predictability. Increased levels and types of opportunities for public involvement provide another manner of

addressing predictability. The rationale behind this assumes that stakeholders, working in concert with the agencies over time, will come to common understandings regarding the likelihood that various activities will actually be implemented. For example, timber industry representatives would gain a better understanding of the likelihood that a given timber sale would be appealed, and could work with the agency and potential appellants to reduce this likelihood.

A third way to address predictability of resource flow is through the various measures proposed to restore ecosystem health. One way this could affect predictability is to reduce the risk of catastrophic fires that have the potential to change anticipated flows of many types of goods and services suddenly. A fourth way is that by achieving better compliance with endangered species laws, resource flows would be less likely to be disrupted by successful appeals based on agency non-compliance. A related hypothesis is that by achieving long-term ecosystem health, resource uses at sustainable levels would be more likely to be achieved over the long term. One philosophy of ecosystem management is that long-term health would lead to greater predictability of a wider range of societal benefits, including not just commodity production opportunities but recreation and amenities, fish and wildlife habitat, and clean water.

Relevant objectives and standards — Alternatives 3 through 7 contain an objective that directly addresses the predictability of timber harvest levels:

> SE-03[5]: Avoid large shifts in commercial activity that cause rapid changes in demand for labor (gain or loss of jobs) and capital (investments in plant and equipment) by offering commercial timber for sale at an amount consistent with the volume available from the acreage of timber harvest planned in tables 3-12 (Guideline SE-G1[6]). Limit annual variations in timber production by no more than plus or minus 15 percent for Alternatives 3 and 5, plus or minus 25 percent for Alternative 4, plus or minus 50 percent for Alternative 7, and plus 10 or minus 20 percent for Alternative 6.

The accompanying Standard SE-S1 mandates achieving this direction unless an exemption is granted from the Regional Foresters or Bureau of Land Management State Director based on "circumstances which make the objective "unattainable." The wording of this objective appears to accept the greatest uncertainty (that is, lack of predictability) under Alternative 7 because timber production would have the widest allowable range of variability; predictability would be allowed to vary second-most under Alternative 4. Alternatives 3 and 5 are designed to allow the greatest predictability, while Alternative 6 is designed to allow more predictability under rather than over anticipated harvest levels. The wording of Objective SE-O3 appears to value stability in harvest levels over increases in them, capping increases over anticipated harvest levels as well as limiting reductions.

The alternatives would address predictability through public participation with one objective that would apply only to Alternatives 3 through 7:

> SE-O11: To help achieve greater predictability for outcomes from lands managed by the FS or BLM and better public ownership of decisions, by providing increased levels and types of opportunities for involvement of the public. Within 1 year develop and implement a systematic approach to seeking the knowledge and opinions of a broad range of stakeholders through methods that encourage discussion, understanding, and resolution of issues.

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[5]SE-03 indicates Social and Economic - Objective, followed by the specific objective number cited (Chapter 3, *Preliminary Draft EISs;* appendix I in this document) (USDA and USDI 1996a, 1996b).

[6]SE-G1 indicates Social and Economic - Guideline, followed by the specific guideline number cited (USDA and USDI 1996a, 1996b).

The Economics chapter (5) of this document, while containing several analyses relevant to the predictability issue, did not directly address it as a factor that would vary by alternative. The alternatives were expected to differ in the levels of employment or other measures produced, but estimates about the relative predictability of those outputs were not made. The perceptions of panel participants regarding predictability constitute the main source of information about potential effects.

Results — Several panel participants questioned the value of the predictability criterion, while others felt it was very important. Although the panel discussion focused on predictability of the supply of timber harvest, grazing opportunities and, to some extent, recreation opportunities, the predictability of achieving desired biophysical conditions also was a primary social concern. Readers should consult the Aquatic, Terrestrial, and Landscape chapters of this document for predictability projections of those conditions.

The predictability of supplies of goods and services would tend to be consistent across the alternatives. The exception is that Alternatives 3 to 7 would differ in the amount of variability in timber production, with Alternative 7 showing the greatest allowable annual variance (± 50%) and Alternatives 3, 5, and 6 showing the least annual variance (± 25% for Alternatives 3 and 5, and +10 or -20% for Alternative 6).

In completing the workbooks, panelists rated the likelihood of alternatives achieving stability in outputs from federally administered lands. Stability implies that flows would be consistent and predictable, rather than simply flowing predictably (that is, output flows could fluctuate widely, but would do so in predictable cycles). The concepts are similar because the issue is not the level of goods and services provided but the extent to which they are assured.

Panelists rated Alternatives 1, 2, and 7 as the least likely to produce stable flows of outputs. The low ratings of Alternatives 1 and 2 were based on the lack of predictability in timber harvest levels over recent years (for example, when actual harvest levels were far lower than the levels anticipated due in large part to likely or successful appeals over threatened and endangered species and habitat conditions). Panelists saw little potential for this scenario to change under the existing management direction. The ratings of Alternative 7 appeared to be predicated on the likelihood that this would be a socially divisive alternative that could lead to uncertainty regarding implementation. Of the remaining alternatives, Alternative 4 was judged to provide the most stable levels of outputs, although still in the moderate rather than the high range. Uncertainty about output stability was highest in Alternative 5 due to panelists' uncertainties about general applications and results under this alternative. Alternatives 3 and 6 were rated between these extremes.

Panelists' conversations reflected this same pattern, as did the UCRB planning area panelists' completion of the worksheet evaluating the predictability of goods and services under Alternatives 2, 4, and 7. Nearly all of the UCRB area panelists rated Alternative 4 as more likely to produce predictable levels of goods and services than Alternative 2, especially over the long term. It was generally thought that Alternative 4 would be more likely to produce predictable (and high) levels of goods and services over the short term as well, because of the higher anticipated levels of activity. Nearly all panelists, however, made it clear that this was based on the assumption that adequate funding would be available—which many panelists doubted would actually be the case. This is a clear example of the difficulty in predicting social effects in the absence of specific information regarding a proposed action.

Monitoring and mitigation — One of the main issues addressed by past planning efforts in the Basin is the relationship of planned to actual activities, outputs, and consequences. Given that predictability is a great concern, monitoring becomes a critical element of the ecosystem-based alternatives. Monitoring is needed not only to

assess whether resource outputs are within the range expected, but also to determine if predicted annual outputs are close to those actually occurring. A major question revolves around the geographical scale of predictability; should it be monitored at the EIS area level, or at some finer scale? A possible mitigation strategy would be to convene a panel of experts and publics to deal with this question.

Effects on Access to Decision-Making

In *Social Assessment of the Basin*, McCool and others (in press) concluded that social scientists, members of the public, and federal agencies concur that ecosystem management requires greater levels of public participation, especially for collaborative efforts that foster mutual learning and the search for consensus on complex, contentious natural resource and public land management issues. A related debate is the role of the public, local and state governments, and other stakeholders in public land management—specifically whether the appropriate role is to provide information, work toward consensus, or share in the decision process.

Wondolleck and Yaffee (1994), among others, have identified many ongoing efforts, some initiated by the agencies and some that began as grassroots efforts of citizens concerned about resource management in a given region, that have successfully expanded public participation in resource management decisions and implementation. Current trends suggest that the public is demanding more meaningful participation in public-land decisions, which suggests that agencies can either choose to accommodate these desires or ignore them, with the latter choice presenting substantial risks to the maintenance of public support.

Criteria — The UCRB area panel called this public involvement criterion "enfranchisement," while the EEIS area panel called it "access to decision making," but it was significant that both groups used terms other than "public involvement" or "participation." This shows that the role of the public is being redefined through societal discourse. Members of all three panels expressed frustration, saying the current decision-making process has left people behind, resulting in management practices that are not acceptable. Panelists believed that involving people in meaningful ways calls for effectively documenting and responding to public concerns, providing adequate opportunities to listen, and showing a commitment to follow through with public decisions about public lands. These elements are viewed as the cornerstones of successful, implementable management, and are especially important given that ecosystem management cannot be accomplished without people working together across agencies, jurisdictions, and ownerships (Smith and others 1995). A clear preference was shown among panelists not to rely on the court system to make decisions, but to work things out jointly on a local level.

Relevant objectives and standards — Alternatives 1 and 2 address public involvement and participation in a variety of ways. Techniques and commitment to involving the public vary widely across the Basin, from the minimum required by National Environmental Policy Act (NEPA) of 1970 to substantial efforts designed to actively seek out public knowledge, values, and opinions for application to public land management decisions. For areas of the Basin that overlap regions covered by the Northwest Forest Plan (USDA and USDI 1994), Province Advisory Committees have been formed to address resource management issues. For other portions of the project area, the Forest Service and BLM have created Resource Advisory Committees (RACs) to provide recommendations on a subregional scale.

Alternatives 3 through 7 contain additional direction. Several objectives directly mention new ways to promote public involvement:

> SE-09: To increase public ownership of decisions, begin greater collaboration through increased intergovernmental coordination with local, state, and tribal governments, and interagency coordination with other federal agencies in planning, implementation, and

monitoring efforts in order to seek the knowledge and opinions from governmental agencies.

The related Standard (SE-S4) requires national forests and BLM districts to sign memorandums of understanding (MOUs) or similar agreements with local, state, and tribal governments within 2 years, to describe how they will work together to accomplish mutual objectives. Another objective (SE-O11) directs agencies to provide increased levels of opportunities for involvement; methods that encourage discussion, understanding, and resolution of issues are especially emphasized.

Alternatives 3 through 7 contain additional provisions for public participation, including ecosystem analysis at the watershed scale. The goal is to involve people who care about a given watershed in the inventory of social, economic, physical, and biological resources in individual watersheds, and also to help set objectives for the management of those watersheds. Alternative 3's theme contains an additional emphasis on the involvement of local residents but without additional standards, while Alternative 5 contains language about coordination at the regional scale.

Results — EEIS and UCRB area panel members did not view Alternatives 1 and 2 as making changes in existing patterns of access to decision making, one of the most important reasons why these alternatives were viewed as unacceptable. The additional provisions of Alternatives 3 through 7 at least provided hope that significant changes would be made. The groups were not talking about holding more public meetings, but about the need for dramatic change in how decisions are made. Panelists were concerned that the details of public participation were not provided in an implementation plan, so they could not judge the actual level of agency commitment. Until these details are known, for many the role of the public will remain words on paper that have little meaning. Panelists viewed Alternative 4 as more likely than Alternative 2 to promote local participation and ownership in federal land management decisions, but only if faithfully carried out. Alternative 7 was viewed less positively due to the restricted decision space available—the reserves, with most activities prohibited, were perceived to have little or no room for public participation in management decisions.

One of the most important concerns expressed by American Indian panel members was consultation, which was viewed not as an event, but as an ongoing process. Indian panelists emphasized the importance of agency willingness to sit at the same table and discuss how trust and treaty responsibilities could be met through public land management activities. Their primary message, repeated again and again, was "You have not listened, and even when you have, we have not been heard." Regarding planning actions on Federal lands, panelists said that tribes need to be involved on an ongoing basis, with consultation extending beyond the requirements of NEPA. Panelists indicated that from the tribal perspective, NEPA is not a tribal law and consultation with the tribes should not be forced into this context. Panelists perceived consultation to be a continual dialogue that results in decisions that reflect tribal concerns, treaty rights, and trust responsibilities; within this stream of dialogue, there is room to talk about NEPA and individual projects. Tribal panelists were especially concerned that tribes had been consulted late in the process, after many decisions had been made and the scope of the decision already narrowed.

Alternatives 3 through 7, if implemented as planned and followed through with regard to public participation, may ultimately result in greater social acceptability and public ownership of decisions. Even if decisions are not completely acceptable, they would be better understood.

McCool and others (in press) found support at the national as well as the local level for paying more attention to the people who would be most affected by local public land management decisions—perceived by most to be local and regional residents. However, national organizations have raised concerns about equity if an increased emphasis is placed on local participation. In evalu-

ating this concern for possible inequity, it is important to recognize that agencies cannot legally abdicate decision authority. In addition, the Federal Advisory Committee Act of 1972 (FACA)[7] was designed to mitigate this and similar concerns by providing balanced membership in advisory groups. The issue of local, regional, and national balance is always a consideration even in groups not formally chartered under FACA, and a number of approaches to addressing this concern have been successfully implemented.

Mitigation and monitoring — Monitoring public access to decision making should involve not just counting the number of meetings or participants, but measures of the perceptions of participants regarding their role in the decision-making process and acceptability of the outcome. Mechanisms for sharing decision making could be explored and implemented on a trial basis. Paying public participants for their time and energy, as well as their actual expenses, may be needed to obtain consistent, high levels of participation. Monitoring is an especially effective way of involving the public; people may not always have the time to become involved in lengthy planning efforts, but may wish to be active in checking whether the agencies did what they agreed to do, and whether those actions were effective.

Although recent changes in FACA make involvement of local, state, and tribal governments more possible, there are no additional provisions for public participation on an ongoing basis. The agencies could explore possible changes to FACA that would allow groups of stakeholders to meet with agencies regularly, while still maintaining the balance of representation and avoiding the abuses that FACA was designed to prevent. In the absence of legislative change, the agencies could explore the need for additional advisory groups established under FACA. However, the real need may be for additional institutions and mechanisms for cross-jurisdictional coordination of management activities, including public representation.

The commitment to consultation with American Indian tribes will have to be demonstrated before it can become effective. As one panelist described, "We cannot have trust without responsibility, and the Federal Government has not behaved responsibly." This is one reason tribal panelists were extremely skeptical of objectives related to consultation. The effectiveness of consultation needs to be measured by tribal members' evaluation of whether consultation goals are being met.

Effects on Private Lands

The ICBEMP is designed to result in new direction for management of lands administered by the FS or BLM in the Basin, through eventual amendment of some or all of the 74 plans currently used to manage these lands. Information released by the project has repeatedly stated that there will be no attempts to address management of private lands through the process. However, the alternatives may affect private lands in several ways. First, changes in management of public lands can affect the supply of and demand for goods and services – not just on public lands but on those private lands capable of providing similar goods and services. An example provided by the panelists was that greatly reduced timber harvest on public lands can increase pressure to harvest private lands. These interactions may be complex, and depend on many factors outside the control

[7]Federal Advisory Committee Act of 1972 (P.L. 92-463, 86 Stat. 770; 5 U.S.C. Appendix 2) was passed to control the growth and operation of the numerous boards, committees, commissions, councils and other similar groups that had been established to advise officers and agencies in the Executive Branch of the Federal Government. Advisory committees are a group, established or utilized by the Executive Branch, to obtain advice or recommendations for the Executive Branch. FACA requires the group to be chartered and that it operate in accordance with the terms of FACA. The functions of guiding and coordination the administration of FACA reside with the Administrator of the General Services Administration (E.O. 12024 of 12/1/77; reprinted at 5 U.S.C. Appendix 2). GSA has issued regulations for agencies on management of advisory committees [41 CFR 101-6.1001 to 101-6.1035 (1990)]. The Unfunded Mandates Reform Act of 1995 (P.L. 104-4, § 204) exempts intergovernmental communications with federal officials and state, local and tribal elected officials for purposes of exchanging views, information, or advice relating to intergovernmental responsibilities or administration.

of federal land management agencies. Second, private lands adjacent to public lands may be more directly affected; the preliminary draft EISs describe many emerging difficulties in managing the urban/wildland interface area, including fire protection, trespass, and wildlife conflicts. This issue gains importance given the current and projected population increases in the Basin, much of which is likely to occur in interface areas.

Because ecosystems do not necessarily start and stop at public land boundaries, achieving the goals of restoring ecosystem health may not be possible by managing public lands alone. In the project area, just over half the acreage is administered by the FS or BLM. FEMAT (1993) recommended that "federal agencies be encouraged to provide leadership by moving beyond the limits of federal jurisdictions to engage states, tribes, forest industry, and other private forest managers as equal and essential partners in discussing their relative roles in sustaining the region's forests and communities." Such statements, however, inspire great concern among some segments of the public, who view ecosystem management as a possible intrusion on private property rights.

Criteria — Because the intent is to refine management on Forest Service- and BLM-administered lands only, there is little mention of objectives addressing private lands. This and the lack of some types of critical information (such as species viability) make it difficult to distinguish the effects of the alternatives on private property beyond the concerns expressed by panelists. However, some criteria that could indirectly help gauge the effects of alternatives include the degree to which actions are coordinated between public and private ownerships, the degree to which wildland fire risks are reduced, and the number and type of incentives extended to private landowners to attain mutually beneficial objectives.

Relevant objectives and standards — One of the only directly applicable objectives applies to Alternatives 3 through 7:

> SE-O8: Reduce the risk of life and property loss due to wildfire and decrease future wildfire suppression costs by actively managing wildland fuels on areas of FS- and BLM-administered lands within or adjacent wildland/urban interface areas.

A related Standard (SE-S3) calls for coordinating this objective with local governments. The alternatives do not propose any other processes for direct involvement of private lands, such as incentives for landowners to work toward mutual ecosystem health objectives.

Other activities called for in Alternatives 3 through 7 indirectly involve private lands; for example, ecosystem assessment at the watershed scale involves inventory of resources and conditions in watersheds at the local level. Conditions across watersheds are studied in this process to provide a context for management of Federal lands by assessing interactions with resources and conditions located on non-Federal lands. It is recognized that just "studying" conditions on non-Federal lands can be controversial.

Results — Panelists identified a mix of potential effects on private lands. In particular, Alternative 7 was viewed as having a greater effect compared with the existing situation, because it could shift the social burden of providing timber, grazing, and some types of recreation opportunities to private lands. One panelist commented that when private lands have previously become the dominant source of timber, the incentive has been to over cut while prices are high, leading to long-term effects on forest productivity and ecosystem health.

Creation of large reserves could increase the attraction of the Basin for quality of life migrants who would enjoy the recreational and scenic amenities and other characteristics associated with reserves. This could increase land values, which might encourage subdivision and settlement of the interface areas and lead to loss of agricultural land in some locations. It also was viewed as having the potential to increase conflicts between

long-time residents and newcomers who may have different value systems. Other effects mentioned included increased smoke from wildfires left to burn.

Some of the same effects were projected under Alternative 4, in part due to its decrease from current levels of timber harvest and grazing opportunities. Panelists also mentioned that tightening regulation of Federal lands to protect endangered species could have the effect of allowing less restriction on private lands. In addition, greater predictability of resource supply and the reduced risk of catastrophic fires could allow private timber owners to better manage their lands. Over the long term, improvements in ecosystem health were viewed as increasing property values and the desirability of the Basin as a place to live and visit. Alternative 4, then, was generally viewed as having fewer adverse effects on private property compared with Alternative 7.

American Indian panelists voiced great concern at the prospect of being asked to "shoulder the conservation burden that the United States left by the wayside of resource exploitation." Panelists cited a planned U.S. Fish and Wildlife Service (USFWS) rule that describes contributions from non-Federal lands as necessary to meet conservation objectives. One member put it this way: "USFWS plans to include Indian lands without regard to the special status of Indian trust lands under Federal law." A critical and related issue for the tribes was the severe restrictions on treaty-protected fisheries that have been made because of past and ongoing resource exploitation for economic purposes.

The potential for shifting impacts from public to private lands could be mitigated by close coordination with local landowners and local governments. Alternative 3, which would focus attention on local coordination (but in unspecified ways), could prove more successful at accomplishing this.

Increased protection of wildland/urban interface areas from wildfire would undoubtedly protect property and lives, but could also have the effect of encouraging additional development in the interface areas, increasing the likelihood that other problems and conflicts could develop.

The success of restoring ecosystem health under all alternatives may depend in part on actions taken by private landowners. The lack of positive incentives for private landowners to participate voluntarily may detract from this effort. The success of public participation efforts undertaken under Alternatives 3 through 7 has the potential to determine local landowners' willingness to participate in ecosystem management. Involvement of local governments in a meaningful way also could advance cooperation among Federal and non-Federal land managers. Successful consultation with Indian tribes could lead to increased coordination of management activities.

Monitoring and mitigation — As suggested previously, the presence of positive incentives to help achieve ecosystem health voluntarily, coupled with a strong and effective public participation program and increased access to decision making, could encourage private landowners to work with Federal, state, and local governments to identify and achieve mutually agreeable ecosystem objectives.

Monitoring effects on private lands would have to be tempered by desires of private landowners to maintain privacy. Data collection efforts would need to be accomplished by individuals who are trusted and not associated with regulatory authority; participation could be voluntary to assure that individuals maintain proprietary decision-making authority over any actions taken on their lands.

Monitoring efforts would benefit from an initial dialogue with private landowners and their associations on what types of information would be mutually agreeable to track over time. An examination of existing arrangements of public/private partnerships could be helpful to understand the conditions that have led to successful cooperation in the past.

Effects on Communities and Quality of Life

As described in McCool and others (in press), there are many definitions of "community." In this chapter, as in the above-cited document, the primary definition is a spatially-defined place such as a town, and specifically the nearly 500 small, rural communities within the Basin. Management of Federal lands could potentially affect communities in several ways: (1) through provision of employment and income opportunities; (2) through support of community attractiveness and general quality of life via provision of recreation, scenery, healthy forests and wildlife populations, and clean air and water; (3) through revenue sharing payments; and (4) through the placement of federal employees that share their skills and energies in civic affairs.

Quality of life can be loosely identified as the combination of economic, political, psychological, social, cultural, and environmental characteristics that contributes to residents' well-being. An area with a high quality of life contributes positively to the functioning of individuals, resulting in the person being satisfied with the living experience in the community. Areas with high quality of life tend to attract new residents. A serious concern among residents of small, rural communities related to quality of life is the question of equity, that is, who loses and who benefits under each of the proposed alternatives.

Federal lands also play a role in quality of life for nonresidents of the Basin. As discussed in McCool and others (in press) and Haynes and others (in press), people may visit or move to the Basin in the future, based in part on the presence and management of Federal lands. Even if people do not visit the Basin, they can value its resources and conditions for many reasons, including the possibilities of visiting there in the future, the knowledge that Basin resources will be available for future generations, and the value associated with knowing Basin public lands and resources are there. Chapter 5 of this document (Economics) demonstrated that these non-use values can be substantial, such as in the case of unroaded areas.

Generalizing the effects of the alternatives on communities and quality of life must be recognized as highly problematic. Not only do communities vary greatly in terms of size, economic structure, setting, and relationship to federally managed natural resources, they are nested within larger levels of social organization. A host of exogenous factors—in addition to Federal land management policy—may affect their future. Even communities in close proximity to FS- or BLM-administered lands may experience entirely different effects from the same alternative. Because of high levels of uncertainty about implementation of the alternatives and how they will translate into effects at the community scale, predictions of the consequences of federal land management actions on specific communities, or even categories of communities, cannot be made with confidence at the Basin scale.

The next sections describe concerns at the community scale, and how they are addressed by the alternatives for five relevant quality-of-life factors: (1) jobs and income, (2) payments to counties, (3) recreation and access to public lands, (4) scenery, and (5) community resiliency. Following this is a discussion of the panel evaluations and other data relevant to estimating the types of changes likely to occur under each alternative and the panels' evaluations of those changes.

Jobs and income — Communities in the Basin tend to rely heavily on natural resources as a critical component of economic diversity. For example, 71 of the communities in the Basin were determined to have high employment (10% or greater) in wood products industries, while 321 of the communities in the project area were determined to have high employment (10% or greater) in agriculture. Reliance on Federal lands varies, but is especially substantial for timber harvest in counties identified in the Economics chapter (5) of this document. The changes in employment likely to result from the alternatives have many corresponding effects within communities. The

main effects are on workers employed by affected industries, their families, and on other employment sectors that derive secondary income from those workers. A broader concern is how those changes translate into effects on communities.

The effects of changes in jobs on community vitality are influenced by several intervening variables. These include the resiliency of the community, the presence of wood processing and manufacturing facilities in the community, availability of job retraining programs, community activities to prepare for change and/or strategies to attract new business and industry, proportion of the county budget dependent on federal resource revenue sharing programs, population growth and migration patterns into and out of the community, and the stability of projected harvestable timber flows. As mentioned previously, however, the number and variability of these intervening variables coupled with the sheer number of small communities in the Basin prohibit identifying employment impacts of the alternatives on specific communities.

The alternatives would call for a wide variety of activities that would generate employment opportunities, including new types and levels of restoration activities. Most traditional employment-generating activities would also continue under the alternatives, although with some changes in levels and types of outputs.

The preliminary draft EISs propose additional objectives and standards for economic opportunities on federally administered lands, specifically targeting communities and areas judged most at risk because of their location, economic structure, and reliance on resources managed by the BLM or FS:

> SE-O5: Emphasize customary economic uses in rural communities or geographic areas identified as less economically diverse and more dependent on outputs of goods and services from Forest Service- and BLM-administered lands based on: (1) where these uses generate a substantial percent of local employment; (2) that are geographically isolated; and (3) that are not gaining substantial employment opportunities in other industries. These areas are henceforth referred to as priority areas. Prioritize activities on tables 3-12 and 3-13 in these areas to promote such customary uses as well as new activities in these priority areas.
>
> SE-S2: Priority areas shall be established in the Record of Decision. Changes to priority areas shall occur by amendments to land use plans. Priority areas shall be reassessed every 5 years to determine if conditions warrant a change in priority areas designation.

These reflect a concern for distributive effects, recognizing that some communities will be more strongly affected than others.

Payments to Counties — County governments provide many community services in rural areas, from police and fire protection to road maintenance, libraries, and other social services. Local school districts, which operate as independent units of government in each of the seven states in the Basin, are an additional institutional fixture within communities. Schools offer highly important focal points for community cohesion, since they supply community educational needs as well as cultural and athletic events that draw the community together. Both county governments and school districts in the Basin are the recipients of federal revenue sharing payments, based on the amount of Federal land in the county and the value of the commodities extracted in a given year. The higher the harvest value, the more money returned to roads and to schools.

Schmidt (1995) examined levels of federal revenue sharing in counties within the Basin over recent years to understand the significance of both PILT (payments in lieu of taxes) and 25 Percent Fund payments in supporting these important community institutions. Schmidt reported that 31 counties in the Basin receive additional benefits based on the receipts from the 25 Percent Fund. The majority of counties in the Basin receive baseline

PILT payments of $0.75 per acre regardless of harvest revenue.

Analyses conducted for the preliminary draft EISs showed that at least 20 counties in the project area (6 in eastern Oregon, 1 in eastern Washington, and 13 in Idaho; analysis not completed for Montana and other Basin states) rely on federal revenue sharing payments for more than 10 percent of their total budgets. Of these 20 counties, 15 were rated as low on an economic diversity scale, suggesting that they are particularly vulnerable to changes in federal revenue sharing.

Alternatives 1 and 2 do not propose any new objectives or standards relating to revenue sharing from Federal lands, but Alternatives 3 through 7 contain one objective that is based on the assumption that ecosystem management leads to increased predictability regarding activities that generate income on Federal lands:

> SE-O10: Improve stability of Federal payments to local governments to contribute to long-term budget consistency and planning of local government revenues through increased predictability (SE-O1) of goods and services from Federal lands.

Recreation and access to public lands — Access to public lands and recreation opportunities are important components of quality of life and contribute to the vitality of small communities in the Basin. Many residents live in the Basin because they enjoy recreational opportunities found on federally administered lands. The economic effects of recreation activity are considerable in the Basin, and Haynes and Horne (in press) identified recreation as the highest value use of Federal lands in the Basin. The Recreation Opportunity Spectrum (ROS) was the tool used in this analysis to measure variation among alternatives in recreation opportunities in the Basin. The ROS identifies the type of recreational experience available to a visitor. Within the ICBEMP the seven standard ROS categories have been collapsed to three groupings: primitive/semi-primitive, roaded natural, and rural/urban (see appendix 6-B, table 6B.1 for ROS projections within the Basin by alternative). The presence or absence of roads is the primary determinant in ROS classifications, and blocks of land greater than 2,500 acres (1,012 ha) in size that are more than one-half mile (0.8 km) from a road are classified as primitive/semi-primitive.

In their *Economics Assessment of the Basin,* Haynes and Horne (in press) stated that roaded natural opportunities are used for about 75 percent of the recreational use on Federal lands in the Basin. However, the large amount of primitive and semi-primitive recreation opportunity in the Basin is noteworthy and provides substantial economic value. From a national perspective the region has a comparative advantage in the amount of primitive/semi-primitive recreation opportunities—the Basin has more large areas in this wildland-type classification than any other region in the continental United States. These areas combine exceptional scenery with an experience of solitude that draws visitors from a national and international constituency.

Changes in road management, such as closures and decommissioning, may decrease accessibility for both roaded natural and primitive/semi-primitive opportunities. An additional issue surrounding the question of access deals with the capability of people with disabilities to use facilities and programs provided on federally administered lands. The alternatives do not address the concern of access for people with disabilities.

The preliminary draft EISs have several objectives and one standard that relate to provision of recreation opportunities. Alternatives 1 and 2 do not contain new objectives or standards (except for SE-O12), so the objectives SE-O13 through SE-O15 apply only to Alternatives 3 through 7. Alternatives 1 and 2 anticipate that the recreation objectives in existing plans will be carried out.

> SE-O12: (Alternatives 1-3) Manage for a broad range of resource-dependent, land and water-based recreation opportunities to provide a variety of recreation experiences and

outcomes. (Alternative 4) In addition, identify opportunities to capitalize on restoration efforts by creating new opportunities for low-impact, nature-appreciative recreation and tourism. (Alternative 5) In areas where recreation is the primary emphasis, emphasize the most appropriate recreation and tourism opportunities that reflect current and projected demand and from which public lands are best suited. (Alternative 6) Same as Alternative 4; in addition, identify opportunities to capitalize on restoration efforts by creating new opportunities for low-impact, nature-appreciative recreation and tourism. (Alternative 7) In areas outside reserves, same as Alternatives 1, 2, and 3. Provide additional opportunities for primitive and semi-primitive recreation in reserves.

SE-S5: (Alternatives 1, 2, 3, 4, and 6) Use the ROS or other appropriate agency direction to guide inventory and management to meet goals for recreation settings and experiences. (Alternative 7) Outside reserves, same as above. Manage reserves for primitive and semi-primitive settings.

SE-O13: Identify opportunities to provide public access for land and water-based recreation purposes.

SE-O14: Foster and strengthen partnerships between public and private sectors to raise the quality and quantity of recreation and tourism facilities and services, to avoid duplication, and to share resources.

SE-O15: Take actions that will lead to recreation programs operating in a financially self-supporting manner.

Scenery — Communities are affected by the surrounding scenic condition because an attractive natural setting contributes to perceptions of community desirability. Overall, scenic conditions within the Basin are very good, with several major portions of the Basin representing perhaps the most visually intact areas within the contiguous United States (Galliano and Loeffler 1995). A high quality scenic backdrop helps to attract new businesses, and growth in the Basin can be related to the high quality amenities in the region, of which scenery is an integral part (Rasker 1995). Population growth in high amenity recreation counties in the Basin (Johnson and Beale 1995) has been a major driver of economic growth and job opportunities (Haynes and Horne, in press).

Scenic integrity is the tool used in this analysis to measure variation among alternatives of the quality of scenery in the Basin. Scenic integrity refers to the visual "intactness" of a landscape, which is based largely on the evidence of human disturbance. The more evident the human alterations of naturally evolving or naturally appearing landscapes are, the lower the scenic integrity. In developing an existing scenic integrity inventory for the ICBEMP, classifications used five categories: very high (settings where the landscape is visually intact with only minute deviations), high (settings where the landscape appears intact), moderately high (settings where the landscape appears slightly fragmented), moderately low (settings where the landscape appears fragmented) and low (settings where the landscape appears heavily fragmented) (see appendix 6-B, table 6B.2 for scenic integrity projections by alternative).

The preliminary draft EISs contain several objectives that directly address scenery as it relates to quality of life in the Basin. Note that there is one objective for Alternatives 1 and 2, but three different objectives for Alternatives 3 through 7.

SE-O17: (Alternatives 1 and 2) Meet established visual quality objectives based on management principles and techniques from the applicable agency visual landscape management system.

Objectives for Alternatives 3 through 7 include:

SE-O16: Enhance scenic integrity in areas currently rated as low or moderately low by implementing management activities for forest and range vegetation and road densities at the levels described in tables 3-12.

SE-O17: Maintain the highest level of scenic integrity and decrease short- and long-term risks from wildfire by implementing activities for forest and range vegetation and road densities at the levels described in tables 3-12.

SE-O18: Protect human health and decrease short- and long-term risks of degraded air quality from wildfire by implementing vegetation management activities at the levels in tables 3-12.

Community resiliency — The ICBEMP has used the term "community resiliency" to refer to a community's ability to respond and adapt to change. In their literature review of critical community characteristics, Harris and others (1996) identified a number of characteristics that could help to determine a community's resiliency: community character; cohesiveness; services and infrastructure; autonomy; economic diversity; resource dependence; attractiveness to business; quality of life; leadership; effectiveness of community government; and preparedness for the future.

Community resiliency is an important intervening variable in the assessment of the impacts of alternatives on communities. However, the resiliency of some communities could also be affected directly by the alternatives, particularly due to changes in opportunities for employment. The focus here on smaller communities is based on the assumption that larger communities with currently high levels of resiliency will not be greatly affected by Federal land management actions within the range of activity proposed under the alternatives. This does not mean that groups of families or individual members of larger communities are not affected by changes in flows of resource commodities and other goods and services from federally administered lands, but simply that smaller communities, because of their tendency to possess lower levels of economic diversity and resiliency, may be more sensitive as a whole to changing conditions.

Objectives and standards specific to community resiliency relate to Alternatives 3 through 7:

SE-O6: Within 3 years support rural communities in their efforts to become more resilient by implementing policies which favor local labor, resources, and knowledge and local use of resources, from Forest Service and BLM-administered lands in the implementation of Objectives SE-O1, SE-O2, SE-O3, SE-O8, and SE-O18.

SE-O7: Within 3 years support local strategies that enhance social and economic conditions in rural communities. Define a federal agency role which assists in providing developmental, tourism, and recreational activities that help diversify rural economies and improve quality of life.

Results — This section discusses some of the likely social effects of the alternatives on communities, based on the panels' evaluations, the economic evaluation of alternatives (Chapter 5), and estimates of outputs generated by the ICBEMP. . The discussion is a running narrative rather than discrete sections with their own estimates, although an attempt is made to follow the organization of the previous section. This was done because so many effects either parallel or overlap with others that it seemed inaccurate to treat them as distinct elements. Another consideration was the imprecision associated with estimating effects at such a small scale (communities) based on such a broad scale of actions (the Basin), coupled with the lack of information about critical implementation variables.

In the Economics chapter of this document, Haynes and Horne provide analysis of effects on jobs and income for several natural resource-related economic sectors under the alternatives. Although those data are presented at the county level rather than the community level, which can mask differential effects on diverse communities within the same county, they have implications for community-scale effects.

Haynes and Horne (in the Economics chapter of this document) conclude that effects of the alternatives on jobs within the range industry would

be relatively small (< 100 jobs for all alternatives except Alternative 7), although all alternatives would lead to fewer jobs related to changes in federal range management. The greatest effects identified would be loss of approximately 300 jobs within the UCRB planning area under Alternative 7. Effects on recreation-related activity on Federal lands was expected to be positive under all alternatives, ranging from 3,700 more jobs provided under Alternative 5 to 8,000 more jobs provided under Alternatives 2, 3, 4, 6, and 7. Effects on timber-related employment showed the greatest variability by alternative. Alternatives 2 through 7 would reduce employment levels from those expected under Alternative 1, from 5,900 fewer jobs under Alternative 5 to about 9,200 fewer jobs under Alternative 7. In their economic analysis, the authors go on to suggest that job losses may be greater than these numbers indicate, based on the assumption that between 9 and 15 percent of the timber volume projected may not actually be sold, and due to other factors such as the relatively small size of timber expected to be offered.

Given the current and projected economic growth in the Basin and the total number of current jobs (approximately 1.5 million), the changes projected to result from the alternatives are not likely to create significant social effects associated with employment opportunities, when measured at the Basin or EIS planning area scales. The economic evaluation of alternatives (Chapter 5) suggests that changes will be negligible at the trade center scale as well. The authors identified 17 counties whose economic resiliency is likely to be affected by the alternatives, with about half of those counties losing and about half gaining resiliency (measured by economic diversity). That evaluation also identified 16 counties containing 29 timber-dependent communities; Alternatives 2, 3, 4, 6, and 7 are expected to have negative effects on the timber sectors in those counties; Alternative 5 is expected to lead to less negative effects in eight counties.

Given this information, it is reasonable to expect that the most significant positive and negative effects will manifest themselves at the community scale, not directly discussed in the above-cited Economics chapter. In particular, the greatest risks would be expected in timber-dependent communities that are relatively isolated and that do not have diverse economic structures. This is a cumulative impact, because in most cases timber sectors in those communities have already experienced downturns, with the accompanying social stress for workers, families, and other community residents: "persistent poverty, increased commuting, emigration of community members, the breaking up of family and community support networks, changes in leadership, low morale, uncertainty, heightened conflicts among groups within communities, deep cuts in school budgets are all factors that result from shifts in forest policies if community needs are not addressed" (FEMAT 1993). A community's resiliency is a critical intervening variable in determining the length and the intensity of negative effects. These effects are most likely to be evident in communities having the lowest relative levels of social and economic resiliency which, as described in McCool and others (in press), is estimated to be about 5 percent of all small, rural communities in the Basin.

Panelists in the EEIS and UCRB areas were uncertain how the alternatives may affect communities, although there was a general sentiment that the current plans, as represented by Alternatives 1 and 2, did not resolve key issues. Declines of forest health and fish populations, and the potential negative consequences of wildland fires did not appear to be adequately addressed by Alternatives 1 and 2, making it likely that these alternatives would be less socially acceptable than Alternatives 3 through 7. Panelists recognized that vitality of small communities is partly a function of their economic activity, which is in turn affected by the number of people that reside or visit a community. Haynes and Horne (in press) have identified population growth as an important indicator in predicting economic activity, and since population growth in the 1990s has been strong in the Basin, it provides one piece of evidence that the economy, on a regional scale, is performing well. More important to panelists was the anticipated change

in the relationship of people to the landscape that could be brought by in-migration, especially in terms of recreation pressure. None of the alternatives appeared to panelists to be adequately addressing recreation demand and the pressure it would place on resource management.

For small rural communities in the Basin, continued removal of timber from Federal lands and access to rangelands for grazing is viewed as a significant issue. Alternative 1, which is the no action alternative in both the EEIS and UCRB planning areas, represents a policy direction that has been significantly modified and to which a return is not possible. At the Basin level, harvestable timber volume is expected to decline over the current situation (see the Economics chapter of this document) under all alternatives, although we note that information supplied by the EIS teams displays such a range of timber volume that the alternatives may or may not differ on this variable. In the EEIS area, Alternative 2 (which can be more realistically described as the current policy direction) yields the highest average timber harvest volume. Of the ecosystem-based alternatives, Alternative 5 results in the lowest decrease in volume from Alternative 2. In the UCRB area, Alternatives 3 and 5 yield the highest volumes, which are significantly above levels in Alternative 2. In terms of range forage (see the Economics chapter of this document), all alternatives, except for Alternative 7, show modest declines in animal unit months and Federal range dependent jobs.

Alternative 1 has not been implemented as planned, resulting in substantial decreases in employment in the wood products industry and increased uncertainty for communities. Some panel participants felt that the social impacts of reductions in timber harvesting in the Basin have already occurred. Other participants suggested that trade offs between timber jobs and commercial fishing jobs were implied in the alternatives. Implementation of Alternative 1 may negatively affect recreation and tourism because of declines in fish habitat. Alternative 1 also does not fit into the philosophy of ecosystem-based management, and therefore is contrary to direction of the project. Alternative 1 may have provided more government revenue sharing funds, but it is questionable that this could have been sustained in the long run. There are no proposed objectives and standards dealing with enhancing community resiliency in either Alternative 1 or 2, reinforcing perceptions that small communities no longer can access decision-making processes affecting their futures.

Some panelists argued that the focus on the production of timber as a measure to identify community impacts only continued a management emphasis that traditionally has been unbalanced and has favored commodities over investments in amenities, while recreation may be the biggest growth area in the Basin (a perception confirmed by data reported in Haynes and Horne, in press). However, under current federal mechanisms for collections, recreation does not pay its way, and thus, remains under-valued.

If funded at appropriate levels and if systems for income from recreation were established, recreation could be viewed as a commodity. The lack of revenue returns to counties from the 25-Percent-Fund payment creates disincentives for local officials to support alternatives to reduce timber harvest volumes. Alternative 7 would create a significant drop-off in funds to those counties receiving revenue sharing payments in excess of PILT. Decreases in timber volume that would occur under Alternative 7 could be counterbalanced by increases in prices, thus the effects are uncertain. Only Alternative 1 would provide levels of revenue sharing in the 25-Percent-Fund that are close the fund's payments to counties provided over the past decade. It is unclear what the effects of Alternative 4 may be on revenue sharing. While timber harvest levels are projected to decrease from the current situation, prices may rise, leading to potentially no net change in revenues to county governments, depending on market conditions.

Panelists also identified that the extraction of non-traditional forest resources and the access to these resources are becoming more of an economic issue. Greater returns to the Federal Treasury may be

provided by some non-timber forest products than by the harvest of wood products. These "special" forest products also present cross-cultural conflicts, based on different uses and/or harvesting techniques associated with ethnic groups. None of the alternatives addressed the contributions to communities of non-timber forest products. Impacts to cultural groups (such as Hispanics and Asians/ Pacific Islanders), who may use federally administered natural resources for non-traditional forest products, are unknown because estimates of harvestability of culturally salient plants and animals were not available from the ICBEMP.

Road density measures provide de facto estimates of access to federally administered lands for a variety of purposes, including access to plant and animal species and culturally important sites for American Indian tribes, access to non-traditional forest products and access to a variety of recreational opportunities. In the EEIS area, the proportion of land in the highest road-density classes (> 1.7 miles /sq. mile) would decrease significantly under Alternatives 3, 4, and 7. There are no major changes in road densities in the other alternatives (see appendix 6-B, table 6B.3 for road density projections by alternative). Under all of the alternatives there would be no increases in the lowest road-density classes, suggesting that access in general would continue at current levels. Apparently much of this decrease would come from relatively small timber harvest on spur roads, while major thoroughfares would remain open. In the UCRB area, only Alternatives 6 and 7 result in changes in road densities. These alternatives would lead to 12 and 14 percent reductions, respectively, in the proportion of roads in the "high/extremely high" density classes, with no changes in the lower road-density classes.

The amount of area and number of roadless areas, would be unaffected by the proposed alternatives. Under Alternative 7, 40 percent of the federally administered land in the Basin would be designated as reserves. This designation, accompanied by lack of prescribed fire management, may significantly change the vegetative composition and character of these roadless areas. No projections were made specifically for the existing roadless areas, so this conclusion is speculative.

Changes in amounts of area in both primitive/ semi-primitive and roaded/natural ROSs are relatively modest under all alternatives and are localized to the Lower Clark Fork and Southern Cascades Ecological Reporting Units in Alternative 5 (see appendix 6-B). Across the Basin, Alternative 5 represents a reduction of approximately 77,000 hectares (214,890 acres) in primitive/semi-primitive classes over the current situation. Data provided by the economics staff suggests that this amount of conversion will have little effect on net economic benefits of recreation at the Basin level.

Recreational use is projected to increase dramatically, partly in response to rising populations within the Basin and partly because of increased tourism, which is an economic development policy of all the states in the Basin. Changes in road management involve decommissioning or obliteration of the road surface, therefore, reductions in roads do not provide for increased opportunities for hiking, hunting, fishing or mountain biking that have been dependent on a road-like trail surface. Reductions in road density could potentially increase road traffic, as demand for natural resource-based recreation increases, but fewer miles of road are available. Such increases may lead to congestion, conflict, and decreased air quality because of increased dust production. Such obliterations, however, may lead to less sedimentation entering streams, which subsequently could have a positive affect on fish populations and result in greater fishing opportunities. The alternatives may have no discernable affect on access for disabled persons.

Panelists commented that the effect of management actions on communities has often been cast as a trade off between recreation and traditional uses; this does not reflect the complementary effects of roads to recreation access, the funding for road maintenance from timber harvests, and the new types of harvest techniques to maintain scenic characteristics.

Related to scenic condition, Alternatives 3, 4, and 7 would lead to relatively sizeable proportional increases in lands of "high" and "very high" scenic integrity classes in the next decade within the EEIS planning area (appendix 6-B). These alternatives then would be expected to enhance the viability of communities located in the nearby area by making their surrounding settings more visually attractive. In the UCRB planning area, the situation is somewhat more complex. Nearly two-thirds of the federally administered lands in this area are currently rated as "high" or "very high" in scenic integrity with many of these lands lying within designated wilderness and other protected areas. Alternatives 3, 4, and 5 would cause somewhat of a decrease in scenic integrity and Alternative 7 would promote a modest increase (appendix 6-B). Therefore, in the UCRB area, we would expect to see community viability affected only in a minor way, from shifts in scenic integrity.

It would be useful to group communities based on the five scales that were used to define resiliency (economic structure, civic leadership, social cohesion, preparedness for the future, and amenities), in order to identify the different paths to achieving resiliency and the implications for dealing with change. As a preliminary step in this effort, ICBEMP staff conducted a series of cluster analyses (SPSS Inc. 1989). The results suggested that it is useful to think of three types or groups of communities with respect to resiliency.

The first group had the highest scores for all five factors that make up the resiliency index; these were communities viewed by their leaders as attractive, economically diverse, socially cohesive, and having strong civic leadership. These communities also tend to be larger in population and exhibit the greatest economic diversity. This group tends to contain a larger number of communities than the other two groups. These communities presumably have a number of different characteristics that will allow them to meet new challenges successfully.

The second group of communities had comparably high scores on civic leadership and amenity values, but much lower scores on social cohesion and economic diversity. Towns in this group have considerably less population than those in the first group. The number of towns in this group is slightly lower than the number in the first group. This type of community may lack the economic base to deal with change successfully, but this could be compensated for by forward-thinking civic leaders and the presence of amenities.

The third type of community identified tends to have the lowest scores on all of the measures. They are intermediate in population (though closer in size to the smallest rather than the largest towns). These communities may find it difficult to cope with change because they have few current strengths on which to build. This group contains far fewer towns than either of the other groups. Mitigation could be targeted to these communities, following further analysis.

Much of the panels' discussion centered on Alternatives 1, 2, 4, and 7 because they seemed to have the most meaning and were understood best. Panelists tended to have a more difficult time identifying the unique elements of Alternatives 3, 5, and 6. Alternative 4 was viewed by panelists as having higher social acceptability than either Alternatives 1 or 2. It was suggested that Alternative 4 may likely result in greater economic diversity because needed restoration efforts would be accomplished. This alternative could also increase in-migration to the Basin and its smaller communities, which could result in higher levels of social conflict because new residents may bring with them different value systems. Because Alternative 4 involves substantial restoration activity, and such activity requires a funding level that is uncertain, it is difficult to evaluate its effects on employment and communities, although objectives and standards identify a preference for local hiring (as they do for Alternatives 3 through 7). Not enough information was provided to determine if marketed timber volume under restoration-focused management would be profitable or of sufficient stability for the private sector to make long-term investments such as the development of new processing plants. Alternative 4, however,

may provide employment opportunities by the government and private sectors, thereby keeping youth residing in smaller communities at home and reducing out-migration. Restoration of rangelands may increase forage availability, thereby resulting in a positive effect to ranchers, assuming the increased forage can be utilized by cattle.

Alternative 7 was viewed by the panelists as having many potentially negative impacts. It was felt that Alternative 7 carried a greater likelihood of catastrophic events that could move outside the reserves. This would increase uncertainty for humans. Alternative 7 may increase scenic integrity and quality of life for many, yet could also lead to potential increases in in-migration. Such increases in population growth may lead to more subdivisions, thereby increasing population density, habitat fragmentation, and wildfire hazard. Panelists were concerned that such subdivisions would not pay for the government services needed by residents. Alternative 7 may also involve much smaller staffing levels for the FS and BLM, which could lead to negative effects such as the availability of skills and knowledge for managing change in local communities, and substantial reductions in resource-based revenue sharing. On the other side, some panelists felt that Alternative 7 may force communities to reconsider their economic futures, thereby increasing their resiliency.

Finally, there may be an inequitable distribution of costs and benefits among the alternatives. Under Alternative 1, smaller rural communities may receive much of the economic benefit (in terms of jobs and employment) generated by timber harvesting activity and the use of below-cost timber sales. Alternative 2, because of the restrictive interim measures (such as those in PACFISH 1995), could place more of the cost on small communities, primarily because jobs would be lost in the resource commodity industries. Specific objectives for enhancing community resiliency are established under Alternatives 3 through 7, in order to confront potential changes in the distribution of costs and benefits.

However, panelists disagreed about establishing priority areas based on isolation and employment growth in other industries, suggesting that these criteria were too limiting for mitigation programs, and implying that the Federal Government was forsaking small communities. Under Alternative 3 small communities would receive a larger share of the benefits because they would have a strong voice in local resource management decisions. This does not necessarily mean that increased timber harvesting would result, only that it is more likely that local needs would be addressed. If the jobs created by Alternative 4 materialize, and if a priority is given to local labor to accomplish restoration, then smaller communities may benefit as well.

The distribution of effects under Alternatives 5 and 6 are unclear. Alternative 6 may have the same effects as Alternative 4, but they would occur over a longer timeframe. Longer timeframes may increase the uncertainty associated with implementation of this alternative, reducing its social acceptability. Alternative 7 could shift benefits well away from smaller communities to the nation as a whole. The costs, in terms of resource commodity processing jobs, increased variability in commodity flows, and increased risk of wildfire, may be borne by smaller communities. Communities that currently have low levels of resiliency may be particularly affected. However, some communities would be expected to benefit, and much would depend on how reserves and matrix lands were actually managed.

Monitoring and mitigation — The ability to monitor changes will require agreeing about appropriate indicators of community vitality among agencies and representatives of other public and private institutions. The very process of identifying these indicators could be a positive first step in understanding the manner in which Federal lands interact with communities and effect quality of life at finer scales. Measurement would be advanced by cooperative efforts to collect and communicate information among a wide range of stakeholders, such that greater trust in the quality of information collected could be generated.

Policy decisions about the appropriateness of federal agency interventions to mitigate changes in resource flows to rural communities will need to be made via a process that is open to public participation and addresses the issue of equity—both within and between the community groups identified in the previous section of this chapter. Typically, efforts to deal with a changing business environment involve retraining programs supported with public funds. Yet, a climate of declining budgets across government programs will require realistic projections of available funds and their potential distribution. Past experience suggests that retraining programs, although they may ultimately provide economic benefits, still have their social costs, especially for people whose occupations and lifestyles are intertwined with natural resources and public lands.

An evaluation of programs that have been offered to former timber workers in western Oregon and Washington as a result of the President's Forest Plan (USDA and USDI 1994) may be helpful in the design of transition strategies. Additional research, such as surveying workers who have and have not participated in retraining, would help to further define the costs and benefits of such programs. Monitoring federal payments to counties and the resulting effects, especially on counties most dependent on federal revenue sharing, could suggest targets and approaches for mitigation strategies. Local governments should be active participants in this process.

The Community Self-Assessment workshops held in one-half of the Basin's small, rural communities (Harris and others 1996) provide a starting point for further efforts that could involve more community residents and work toward finding collective solutions to collective problems. Such groups could also play a valuable role in monitoring the effects of implementation, working to reduce negative effects and capitalizing on positive ones. The role of the FS and BLM in this effort could be determined on a community-by-community basis, depending on the needs and desires of community leaders and other participants.

Effects of Alternatives on American Indian Tribes

American Indian tribes have long occupied the Basin and their interests and rights are defined in a series of treaties signed in the Nineteenth Century. These rights and interests have been interpreted and enforced in a variety of court decisions and congressional actions. Each tribe has an individual identity and relationship with the United States Government. Aggregating individual tribal interests for the entire Basin may overshadow specific concerns of individual tribes. Nevertheless, American Indian tribes have a number of common interests and concerns which may be affected differently by the alternatives.

In examining tribal interests in the West, Hanes (1995) recognized that key issues revolve around sovereignty, trust status, self-determination, self-governance, access to sacred places, and harvest of traditional foods and medicine. Several of these same issues were brought forward in the panel session of tribal representatives to assess the consequences of implementing the EEIS and UCRB EISs. The areas of interest that the panel addressed in relation to these two EISs focused on seven major areas: (1) trust responsibilities, (2) access to public lands, (3) quality of water and land, (4) opportunities for economic growth, (5) culturally significant plant and animal communities, (6) air quality, and (7) places. Each of these interest areas will be examined below as criteria for evaluating the proposed alternatives.

The tribal panel had difficulty accepting not only the format of the EISs, but the evaluation process as well. The panel entered the evaluation process at the "end" of the initial developmental phase of the project and within a context of a long history of what they view as inequitable solutions of their interests. Not only had Indians lost their traditional uses of lands over the period of conquest and forced relocation to reservations, they felt they had not been treated fairly in the application of management decisions. Executive Orders by the President to live up to obligations to the tribes are perceived to have been ignored or applied in incon-

sistent fashion. There appears to be little accountability when transgressions occur, and no incentives have been proposed to evaluate whether or not tribal interests are being addressed. Plans and programs for management are perceived as driven by the supply of outputs that are valued by others, but these programs are not holistic or guided by objectives to support the lifeways of the tribes.

Whole system divisions that are inherent in the structure of an EIS document and the paradigm of science run counter to the manner in which tribes view themselves and their relationship with the environment. Although several panelists appreciated the fact that a watershed approach was being used in the ICBEMP, there was a strong sentiment that an EIS was a clumsy and inappropriate vehicle to make decisions about the diverse interests of people.

Trust responsibilities — The Federal Government's obligation to honor its trust relationship and fulfill its treaty commitments is known as its trust responsibility (Pevar 1992). The competition and conflict between native and Euro-American people in the 1800s resulted in a treaty-making period between tribes and the United States Government. Upon signing treaties with American Indians, the government assumed a legal obligation in which the Indians trusted the United States to fulfill promises given in exchange for their land. In the 1831 Supreme Court decision, *Cherokee Nation v. Georgia*,[8] Chief Justice Marshall characterized American Indian tribes as "domestic dependent nations" with a government or nation-state status and a special relationship to the United States (Cohen 1982). Pre-existing rights which were not specifically granted to the United States through treaties or agreements or which were not expressly terminated by Congress continue to this day, and even a treaty that is silent regarding hunting and fishing rights implicitly reserves those rights (*Menominee Tribe v. United States*;[9] see Getches and others 1993).

Trust responsibilities in the Basin are related to: (1) natural resources on reservations and ceded lands, and in traditional use areas regardless of their location; (2) rights associated with access to certain areas, plants and animals off-reservation; (3) the right to self-determination (self-governance); and (4) the right to social well-being. These responsibilities are applied to many resources and lands administered by the FS and BLM.

<u>**Evaluation of alternatives**</u> — The effects of alternatives can be only understood within the context of historical relationships between the tribes and the U.S. Government. Therefore, this section contains substantial description of tribal viewpoints on this relationship and how it influences estimates of effects.

The EEIS and UCRB preliminary draft EISs contain two objectives to guide federal agency actions regarding their relationship to tribal interests for Alternatives 3 through 7. Each of these objectives contains one standard that identifies a process by which federal management actions are to be undertaken. The objectives and standards do not apply to Alternatives 1 or 2.

> T-O1[10]: To help meet the Federal Government's responsibility (to) maintain a government-to-government relationship with affected federally recognized tribes (agencies will) develop meaningful relationships to understand and incorporate tribal needs, interests, and expectations in Federal land management (and will) allow cooperative activities where there are shared goals.
>
> T-S1: (1) Agencies shall consult with all affected federally recognized tribes on projects at the proposal stages, and at other stages as appropriate. (2) Agencies should consult with all federally affected Indian tribes/communities on (a) project at proposal stages, and at other stages as appropriate.

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[8] *Cherokee Nation v. State of Georgia*, 30 U.S. (5 Pet.) 1, 8 L.Ed. 25 (1831).

[9] *Menominee Tribe of Indians v. United States*, 391 U.S. 404, 88 S.Ct. 1705, 20 L.Ed.2d 697 (1968).

[10] T-O1 indicates Tribal Interests - Objective, followed by the specific objective number cited (Chapter 3, *Preliminary Draft EISs*; see appendix I in this document) (USDA and USDI 1996a, 1996b).

T-O2: To help meet the Federal Government's responsibility toward tribes, maintain and/or restore habitat conditions at or above a level capable of supporting healthy, sustainable, and usable quantities of species/resources by implementing activities in Tables 3-12 and 3-13.

T-S1: (1) Agencies shall assess habitat conditions (using biological evaluations or other means) and discuss assessments with affected tribes at the earliest practical stage in planning a project. (2) Agencies shall assess habitat conditions (using biological evaluations or other means) where a habitat has an identified social or traditional importance to an affected tribe or American Indian community, such as root fields or fishing grounds.

Consultation with the tribes is an essential component of operationalizing trust responsibilities but there may be significant differences in what consultation means to the tribes and the U.S. Government. Undoubtedly, consultation may vary according to the norms and cultural preferences of individual tribes. The tribal panel felt that consultation on this project was not achieved because their input was not incorporated until late in the project, thereby calling into question the sincerity of the proposed objectives and standards.

The American Indian tribal panel unanimously agreed that none of the proposed alternatives would meet the Federal Government's trust responsibilities to the tribes in the Basin. The tribes communicated clearly that "trust" is a term that they interpret as responsible behaviors in the management of natural resources. In the view of the panel, the U.S. Government has allowed unacceptable levels of degradation of the lands and waters entrusted to federal agencies for management.

From the perspective of the tribal panel, the alternatives do little to address fundamental treaty-identified concerns regarding the quantity and quality of water, the harvestability of fish populations, deer hunting opportunities, and the availability of roots and berries. Further, as long-term residents of the Basin with a tradition of evaluating actions over multiple generations, the tribal representatives on the panel see the FS and BLM approach as transitory, fulfilling the bureaucratic needs of the current situation instead of the needs of future generations.

An additional issue of concern regarding the fulfillment of trust responsibilities related to the capacity for federal land management agencies to intervene with state governments on behalf of the tribes. Particularly concerning the issue of water quality, tribal representatives believe that they are operating at a disadvantage with state government agencies, and that Federal trust responsibilities regarding the maintenance of water quality and quantity should extend to advocacy activities with other institutional units of government.

Alternatives 1 and 2 were the least acceptable to the tribes in meeting the trust responsibility criterion. They do not explicitly provide mechanisms for a consultation process and continued the business-as-usual approach to establishing priorities for management action. Current plans do not contain mechanisms to improve working relationships between the Forest Service, BLM, and the tribes, and from their perspective this lack of a cooperative framework is unacceptable. Alternatives 3 through 7 were viewed as an improvement in the respect that they at least acknowledged a need to involve tribes in management planning. The tribes have been exempted from restrictions of the Federal Advisory Committee Act but feel that they have yet to witness collaborative planning efforts.

Access to public lands — Access to federally administered lands is important for American Indian tribes in order to uphold the rights to resource uses that are reserved under treaties. These resource uses involve, but are not limited to, activities such as gathering culturally significant plant species, engaging in hunting practices, and the use of ceremonial sites. Since the form of access to these resources has evolved to include the use of motor vehicles, the opportunities for tribal members to use roads have become a point

of interest to tribes when issues of road management arise.

Access also involves the ability of tribes to continue usual and customary uses in places where administrative restrictions have been placed for other management objectives. For example, the restrictions placed on land uses in Research Natural Areas may constrain traditional tribal-use patterns. Special designations of places may also be accompanied by behavioral constraints, such that limits on the types of uses (for example, horseback riding and camping), the number of visitors, or the duration of visitation may be considered a restriction of access.

Evaluation of alternatives — Panelists thought that Alternatives 1 and 2 would not meet tribal interests for adequate access. Tribal representatives view these alternatives as flawed, since the existing plans were not produced with provisions for adequate tribal consultation over access and other important issues. Panelists felt that opportunities for Indians to hunt or use resources in traditional ways were not considered in current plans; these plans created zones for resource emphases that did not coincide with tribal-use patterns. As a result, panelists felt that traditional pathways to resources have been obliterated by activities such as the fencing-off land or other developments; this has particularly disrupted activities such as grazing. Land exchanges with other private property owners or special use provisions have blocked access to places of cultural significance. Fees charged for camping and other use restrictions have placed limitations on the ability of tribes to use locations that retain cultural significance.

Panelists stated that current plans contain restrictions on access that should not apply to the tribes. For example, one panelist stated that the restriction of parties on horseback to no more than 12 horses (in designated wilderness) has constrained the usual and customary uses of certain areas, since tribes did not necessarily travel in groups with 12 horses or less. Although Alternatives 3 through 7 offer additional consultation assurances, there is no visible mechanism in any of the alternatives to provide redress for administrative restrictions or the location of developments that have presented barriers to tribal uses. Alternatives 1 and 2 could provide increased recreational access and use of culturally important sites, potentially harming these sites.

Individual responses of panelists to the acceptability of alternatives regarding access reveal that respondents are either very certain or somewhat certain that Alternatives 1, 2, and 3 will harm tribal interests (Alternative 3 was viewed by panelists as largely a continuation of current management practices with only slight modifications). Panelists felt that Alternatives 4 through 7 were more acceptable, perhaps due to the changes that are anticipated in resource conditions through restoration and conservation measures.

Quality of water and land — The effects of current land-use activities on water quality and quantity are of paramount interest to the tribes in the Basin, as water is viewed as the most sacred of substances (Hanes 1995). Water is often characterized as the bloodline that runs through the land (Meyer 1983). Ritual activities almost always involve water, and the supply of clean water is seen as the foundation of a sustained tribal lifeway. Clean water is also used in processing food, since immersion in water for leaching is a common practice. Factors such as sediment delivery to streams, channel morphology, water temperature, streamside riparian zones, point and non-point contamination, water quantity, and flow timing are of key interest.

Water rights issues are fundamental to water quality and quantity concerns. Two types of water rights are pertinent to tribal water issues. One is related directly to water associated with reservations to sustain tribal lifeways, and the second is instream flow to sustain off-reservation treaty resources (most notably fisheries). Although certain water rights in the Basin have been established by case law (see Winters Doctrine versus Winans[11] case), many water rights issues remain unresolved.

[11]Winters Doctrine refers to *Winters v. United States*, 207 U.S. 564 (1908); the Winans case, *United States v. The Winans*, 198 U.S. 371, helped define the nature and extent of Indian reserved water rights.

The next decade or two may reveal to what extent reserved rights are defined (Hanes 1995).

Although land quality was identified as a concern of the tribal panelists, it was not thoroughly addressed in evaluating alternatives. Issues of interest regarding land quality included the maintenance of site productivity and the containment of erosion, as well as concerns over forest health conditions.

Evaluation of alternatives — Panelists did not observe substantial differences among alternatives in meeting their interests in the maintenance of water and land quality. Alternatives 4 through 7 would promote a higher level of restoration than current plans. None of the alternatives would deal directly with the states regarding their regulatory authority over the management of water resources. The panelists expressed a preference for broadly applied standards across the Basin to ensure not only instream flows and water quality protection, but also oversight to protect the quality of groundwater and the recharge of subsurface aquifers.

The protection of soil structure and long-term productivity of terrestrial resources is a concern of the tribes. Alternatives 1 and 2 would do little to address these concerns in terms of controlling erosion from roads and streambank stabilization. Alternatives 4, 6, and 7 would offer greater opportunity to prevent soil erosion and sedimentation in streams via the effort to restore and/or conserve major portions of the landscape. Current plans, as represented by Alternative 1, would not effectively achieve conditions more suitable for fish, although the direction in Alternative 2 would provide greater protection for riparian and aquatic habitats. Alternatives 1 to 3, because of their less pervasive approach in addressing cumulative effects of past actions, would not be as acceptable to tribes as the other alternatives.

Opportunities for economic growth — Economic conditions for tribal members are some of the most difficult for any population group within the Basin. High unemployment rates and low incomes characterize the living conditions of families on tribal reservations in the Basin, and the vitality of rural tribal communities is a major concern of tribal representatives. Tribal business enterprises include wood processing facilities and other businesses associated with resource extractions. The decline in fish populations has had negative effects on the potential to derive income from fisheries, and it has hurt the subsistence potential of tribal members.

From a tribal perspective, economic analyses that focus solely on monetary returns from investments do not represent a full accounting of the contributions of natural resources to the human experience. There is a sentiment among tribes that there is an inequitable access to economic opportunities and revenue sharing payments that result from the management of Federal lands—counties receive payments based on the 25-Percent-Fund and PILT, but the tribes do not receive similar benefits. Revenue to support the education of children was identified as an important need.

Evaluation of alternatives — Estimates of the effects of alternatives on employment in the timber or recreation sectors were not available for consideration by panelists. While information about range employment was provided, it was not disaggregated below the EIS planning area. The continuation of the current land- and resource-use patterns, as expressed under Alternatives 1 to 3, would not meet panelists' expectations for economic growth opportunities. With fish populations and other productive elements of the natural landscape in decline, tribal panelists indicated that excessive levels of extractions are beginning to take their toll on natural systems. One panelist commented, "We are against logging on steep slopes, on overgrazing, and extractions on sacred lands. I would object to more logging and road building."

At the same time, some tribes chose to manage timber, and the timber resources on reservations provide income to some of the tribes. The actions expressed under Alternative 4 (to provide for restoration via commercial timber harvests) were more acceptable to panelists than the other alter-

natives. However, panelists felt that there was not enough information about appropriate levels of harvests, the location of harvests, and the mix of uses to evaluate the effects of Alternative 4 fully. Tribal panelists also had concerns about Alternative 4 being implemented so that it would not adversely affect tribal interests.

None of the alternatives appear to contain objectives or standards that focus on the economic diversification of tribal communities. The fact that objectives were presented for "timber-dependent communities" suggested to the panelists that there continues to be an inequitable amount of attention being focused on one type of community versus another.

Culturally significant plant and animal communities — Plant and animal communities form but one part of the whole set of relationships between a group of people, their culture, and the environment. Culturally significant elements of the Indian lifeway cannot be identified, categorized, and managed separately. The importance of plants and animals can only be measured in the cultural context in which they occur.[12] The concept of ethno-habitat refers to how a culture classifies and organizes a landscape, and the health of this habitat may reflect its capacity to support naturally evolving plant and animal communities.

In the context of ecosystem management on Federal lands in the Basin, culturally important plant and animal communities can be understood as those places where useable and adequate quantities of culturally significant species are obtainable for American Indian tribes. Huckleberry patches, root fields, fishing grounds and stations, and hunting districts represent these places in the Basin.

Evaluation of alternatives — Information indicating how the harvestability of culturally important plant and animal communities would be affected under each of the alternatives was not provided to panelists. Alternatives 1 to 3 were recognized by all tribal panelists as alternatives that would least meet the needs of tribes, since it is anticipated that under current plans habitat conditions would continue to decline. Panelists felt that Alternatives 4 through 7 would provide the most acceptable effects on native plant, animal, and fish species when panelists provided individual responses to the alternatives. Alternatives 4 through 7 would not explicitly promote the improvement of habitat for grizzly bears, but the maintenance of bear populations was identified by panelists as highly important. Alternative 7 is viewed by some tribal representatives as the most positive approach to deal with the management of habitat for wide ranges of species, since it would provide reserve areas that would reduce the impacts of management.

The active management approach to restoration as proposed under Alternative 4 may contain both possible negative and positive impacts, and tribal representatives expressed a desire for more thorough consultation and analysis. Some tribal members expressed concern about "active" management, based on the past track record of FS and BLM management interventions. Alternative 4 may be moving in a positive direction regarding riparian management and other activities affecting aquatic concerns, but panelists thought there would need to be a reorientation on the focus of restoration toward tribal concerns. In general, panelists thought restoration would not go far enough, and because of the flexibility built into the watershed analysis under Alternative 4, the effort to mimic natural processes had the potential to go either way. Restoration activities could be unsuccessful, and there was a concern that they could create further damage. It was observed that the time needed for restoration is much longer than the timeframe of the plan.

Air quality — Air quality standards identified under the Clean Air Act of 1955 provide a useful context for the maintenance of air quality, but

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[12]Personal communication. 1996. Mary Keith. Tribal Liaison, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, Washington, 99362.

there are different cultural differences in how various types of pollutants or particulate matter are interpreted. For example, smoke from some forest fires is not viewed as pollution by tribes, since fire is a natural process providing renewal and regeneration. On the other hand, excessive levels of smoke, which is produced by wildfires that consume high levels of accumulated fuels in overstocked forest stands, are not perceived to be healthy. Another contributor to air quality degradation is dust, which has been introduced mainly through roads. The lack of maintenance of roads or the lack of proper surfacing increases dust and raises concerns for tribes on the quality of the environment.

Evaluation of alternatives — Information on smoke production was not available to panelists for any of the alternatives. Panelists felt, however, that Alternatives 1 to 3 could produce excessive amounts of smoke during large-scale wildfire events. Restoration activities in Alternatives 4 through 7 were perceived by tribes to be an improvement over current conditions, and the long-term effects of restoration would improve air quality. In the short term, restoration efforts under Alternatives 4 through 6 would keep more roads open than Alternative 7, which could create additional levels of dust.

Tribal representatives in the panel session related a concern that there is little coordination between the BLM, FS, state agencies, and the Bureau of Indian Affairs (BIA) regarding the operational aspects of prescribed burning. Among the tribes, this lack of coordination allows for little predictability in expectations for smoke emission or the resulting habitat conditions for species that may benefit from burning. There was a feeling that prescribed burns frequently do not create food and forage for animals. The Forest Service is perceived to be motivated to practice prescribed burning in order to help livestock operations or to promote forest regeneration for plantations, and not to benefit deer, elk, and other native ungulates of interest to tribes.

Places — To American Indian tribes the totality of the regional landscape has importance, and all landscape components participate in a system of complex inter-relationships. Places of importance are created by an intersection of nature, social relations, and meaning (Hanes 1995, Williams 1995). The Indian population of the northern montane region is characterized by a strong, long-term, spiritual attachment to the land. The full range of resources needed to sustain lives and culture was found each in its own place, and Indian people have accrued a "detailed, encyclopedic knowledge of their environment" (Hunn 1990).

Localism, or the identification of a person and a place, has been a key factor in the traditional northern montane Indian lifeway. Place names relay traditional knowledge of land and resources by referring to plants and animals that characterize a location, the actions of people at a location, the spiritual role of the location, or some other important attribute of the site. The historical depth of these relationships and strong cultural identifications must be acknowledged as they reflect more than a place name veneer on the landscape. The importance of place to tribes in the region can be viewed as a hierarchical ordering, from the broadest geographic scale to the smallest. Expectations of what "meaning" each order place conveys to the community and individual are shared within each group and create an image of how these places should be and what they should provide (Tuan 1977).

The FS and BLM are responsible for the protection of cultural sites on lands under their management (as these are protected by law); but there is a poor inventory of cultural sites and frequently these cultural values, the panelists felt, are not sufficiently respected to generate protective measures.

Evaluation of alternatives — The tribal panelists felt that the effects of resource development on the spiritual and cultural qualities of the land have damaged the relationships between tribes and the land. The change in the character of the land through management interventions and

developments as represented by Alternatives 1 and 2 would diminish the value of places to tribes, since the important features that made many places special to tribes have been irreversibly altered. For instance, root fields have been replaced by grazing uses, or berry production areas have been converted to production forestry. Campgrounds have been placed on usual and customary sites. One panelist described an example where a telecommunications site has completely transformed a tribal sacred site, destroying its cultural value.

The panelists felt that the continuation of current plans, as reflected in Alternatives 1 and 2, would not acknowledge the significance of place attachment or create mechanisms to inventory places so that significant cultural values could be maintained. None of the alternatives attempt to recover the damage done to resources from road building and the other cumulative effects of management. They also do not identify policies to recover or restore damage to culturally important sites, nor do they contain standards to ensure more complete historical interpretations of the use of land resources over time; although there is legislation that is designed to provide such direction. Tribal panelists believe that culturally significant trails, as well as places, are not explicitly recognized, protected, or interpreted.

Mitigation and monitoring — Indian interests in regard to public land management issues are pervasive, and because of the diversity of tribal groups in the region and the many legal events that have occurred in the past, a more detailed and systematic accounting of tribal interests for each tribal government would be more appropriately performed as individual administrative units of federal agencies pursue subsequent land-use planning exercises.

Objectives and standards under Alternatives 3 through 7 would provide for consultation, but additional standards may be needed to furnish assurances to the tribes. For example, a standard could address development and implementation of tribal advisory groups for consultation purposes. Standards could deal with how tribal consultation will proceed, assuming such standards are jointly developed with the tribes. These more localized efforts would offer tribes a more prominent role in describing tribal interests and assessing the potential effects posed by proposed actions.

Tribal interests are in conflict with the current definition over the beneficial uses of water, which appear from the tribal perspective to be strongly biased toward consumptive uses. Water management across states is not consistent, with some state laws offering greater levels of regulation of water flows and quality than others, and some providing useful operational guidelines, such as Best Management Practices (BMPs), to protect water resources. Objectives and standards could be developed requiring greater interaction among the tribes, states and Federal Government about water quality and quantity issues.

Monitoring could include processes to assess what progress the tribes and Federal Government have made in consultative venues, the ways to improve such protocols, and methods to evaluate them.

Conclusions

The SIT examined the results of the panel processes addressing social consequences and was in agreement with the major outcomes. Table 6.2 summarizes these major outcomes using qualitative descriptors to show how the alternatives would likely affect the social indicators if implemented. These judgments were based heavily on the results of the panels but also on McCool and others (in press), and Haynes and Horne (in press) and the authors' understanding of the alternatives.

Table 6.2 uses social acceptability, defined as an increased likelihood of a favorable public attitude toward an alternative and its social effects, as its standard. This does not mean that all segments of the public will feel this way, but that on balance, more people and interests are likely to express positive attitudes than negative ones. Making a

summary judgment on social acceptability is an uncertain task at best; responses received during the public comment period on the Draft EISs are obviously a better indicator of acceptability. In addition, each of the evaluation criteria has many facets, some of which may be viewed more positively or negatively than others; this also makes it difficult to summarize acceptability with a single index. For example, each of the criteria includes considerations about equity—who is expected to benefit, who is expected to not be affected, and who is expected to suffer from a given action or condition—which is problematic to summarize with a single index.

Acceptability also is not a dichotomous variable, but one that should be thought of as having several levels. Past projects have defined levels used to describe effects of public land management. For example, one project defined the levels as: effect is unacceptable without significant mitigation; effect is acceptable with minor changes; effect is acceptable without mitigation; and effect is acceptable and desirable (USDA 1991).

Despite these caveats and considerations, it is a valid task to consider social acceptability at this point. It would make sense to do this not just for the social variables, but for all other evaluation criteria as well. Another option for summarizing social consequences would have been to rate the effects themselves, such as estimating whether predictability would increase or decrease under a given alternative, and then provide an independent rating of its acceptability.

Finally, it should be clear that the language and tone of this evaluation are more suggestive of the types of effects likely to occur, rather than conclusive. In addition, many typical evaluation criteria used in social impact assessments at the project level are not possible to address adequately at this scale. However, the resulting uncertainty about social effects could be mitigated through monitoring social indicators developed jointly through public and private coordination at the project scale. Because ecosystem management is designed to be an adaptive process, monitoring plays a critical role in adjusting activities or objectives to meet existing or emerging social, economic, and biophysical objectives.

Table 6.2. Summary of social evaluation of the alternatives. This table summarizes the major panel outcomes using qualitative descriptors (social acceptability[1]) to show how the alternatives would likely affect the social indicators if implemented.

	Alternative						
Evaluation Criteria	1	2	3	4	5	6	7
Effects on Predictability	⇓	⇓	Uncertain	⇑	⇓	Uncertain	⇓
Effects on Access to Decision Making	⇓	⇓	⇑	⇑	⇑	⇑	⇓
Effects on Private Land	⇓	⇓	⇑	Uncertain	Uncertain	Uncertain	⇓
Effects on Communities and Quality of Life	⇓	⇓	⇑	⇑	Uncertain	Uncertain	⇓
Effects on American Indian Tribes:							
Trust Responsibilities	⇓	⇓	⇓	⇑	Uncertain	⇑	⇑
Access to Public Lands	⇓	⇓	⇓	⇑	Uncertain	⇑	⇑
Quality of Water and Lands	⇓	⇓	⇓		Uncertain	⇑	⇑
Opportunities for Economic Growth	⇓	⇓	⇓	⇑	Uncertain	⇑	Uncertain
Culturally Significant Plant and Animal Communities	⇓	⇓	⇓	⇑	Uncertain	⇑	⇑
Air Quality	⇓	⇓	⇓	⇑	Uncertain	⇑	⇑
Culturally Significant Places	⇓	⇓	⇓	⇑	Uncertain	⇑	⇑

[1]Social acceptability is defined as an increased likelihood of a favorable public attitude toward an alternative and its social effects.

⇓ = negative effect; ⇑ = positive effect; Uncertain = uncertain of the effect.

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Appendix 6-A.

List of Panel Participants.

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Ron Torretta, Kalispel Tribe of Indians, Usk, Washington

Lillian Maynard, Burns Paiute Tribe, Burns, Oregon

Allen V. Pinkham, Nez Perce Tribe, Lapwai, Idaho

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John Kelley, Confederated Tribes of the Warm Springs Reservation of Oregon, Warm Springs, Oregon

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Roy Hall, Quartz Valley Reservation, Fort Jones, California

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Table 6-B.1. Recreation opportunity spectrum (ROS) classes for EEIS and UCRB BLM/FS[1]-administered lands by management region, management class, and simulation year 10.

Entire EEIS Management Region BLM/FS Management Class	Current Year[2]	1	2	3	4	5	6	7
		Alternative/Simulation year 10						
Primitive / Semi-primitive (hectares[3])	4,561,800	4,452,000	4,561,800	4,561,800	4,561,800	4,524,300	4,561,800	4,561,800
Percent Change from Current	NA[4]	-2	0	0	0	-1	0	0
Percent of Region /Class Total	38.8	37.8	38.8	38.8	38.8	38.4	38.8	38.8
Roaded / Natural (hectares)	7,206,600	7,316,400	7,206,600	7,206,600	7,206,600	7,244,100	7,206,600	7,206,600
Percent Change from Current	NA	2	0	0	0	1	0	0
Percent of Region /Class Total	61.2	62.2	61.2	61.2	61.2	61.6	61.2	61.2
Rural / Urban (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0
BLM/FS EEIS Total (hectares)	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**

Entire UCRB Management Region BLM/FS Management Class	Current Year	1	2	3	4	5	6	7
		Alternative/Simulation year 10						
Primitive / Semi-primitive (hectares)	9,928,300	9,836,200	9,928,300	9,928,300	9,928,300	9,878,700	9,928,300	9,928.300
Percent Change from Current	NA	-1	0	0	0	0	0	0
Percent of Region /Class Total	58.5	57.9	58.5	58.5	58.5	58.2	58.5	58.5
Roaded / Natural (hectares)	7,050,300	7,142,400	7,050,300	7,050,300	7,050,300	7,099,900	7,050,300	7,050,300
Percent Change from Current	NA	1	0	0	0	1	0	0
Percent of Region /Class Total	41.5	42.1	41.5	41.5	41.5	41.8	41.5	41.5
Rural / Urban (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0
BLM/FS UCRB Total (hectares)	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**
Grand Total of EEIS & UCRB BLM/FS Lands (hectares)	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**

Table 6B.1 (continued)

Blue Mountains Ecological Reporting Unit

EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	887,100	868,000	887,100	887,100	887,100	887,100	887,100	887,100
Percent Change from Current	NA	-2	0	0	0	0	0	0
Percent of Region /Class Total	35.1	34.3	35.1	35.1	35.1	35.1	35.1	35.1
Roaded / Natural (hectares)	1,642,700	1,661,800	1,642,700	1,642,700	1,642,700	1,642,700	1,642,700	1,642,700
Percent Change from Current	NA	1	0	0	0	0	0	0
Percent of Region /Class Total	64.9	65.7	64.9	64.9	64.9	64.9	64.9	64.9
Blue Mountains EEIS BLM/FS Total (hectares)	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	50,700	50,700	50,700	50,700	50,700	50,700	50,700	50,700
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	46.9	46.9	46.9	46.9	46.9	46.9	46.9	46.9
Roaded / Natural (hectares)	57,400	57,400	57,400	57,400	57,400	57,400	57,400	57,400
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	53.1	53.1	53.1	53.1	53.1	53.1	53.1	53.1
Blue Mountains UCRB BLM/FS Total (hectares)	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**
Blue Mountains UCRB & EEIS FS/BLM Total (hectares)	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**

Central Idaho Mountains Ecological Reporting Unit

EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	8,400	8,400	8,400	8,400	8,400	8,400	8,400	8,400
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	93.3	93.3	93.3	93.3	93.3	93.3	93.3	93.3
Roaded / Natural (hectares)	600	600	600	600	600	600	600	600
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Central Idaho Mountains EEIS BLM/FS Total (hectares)	**9000**	**9000**	**9000**	**9000**	**9000**	**9000**	**9000**	**9000**

Table 6B.1 (continued)

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	4,575,400	4,565,900	4,575,400	4,575,400	4,575,400	4,575,400	4,575,400	4,575,400
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	70.8	70.7	70.8	70.8	70.8	70.8	70.8	70.8
Roaded / Natural (hectares)	1,886,900	1,896,400	1,886,900	1,886,900	1,886,900	1,886,900	1,886,900	1,886,900
Percent Change from Current	NA	1	0	0	0	0	0	0
Percent of Region /Class Total	29.2	29.3	29.2	29.2	29.2	29.2	29.2	29.2
Central Idaho Mountains UCRB BLM/FS Total (hectares)	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**
Central Idaho Mountains UCRB & EEIS FS/BLM Total (hectares)	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**

Columbia Plateau Ecological Reporting Unit

EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	201,100	195,200	201,100	201,100	201,100	201,100	201,100	201,100
Percent Change from Current	NA	-3	0	0	0	0	0	0
Percent of Region /Class Total	19.2	18.7	19.2	19.2	19.2	19.2	19.2	19.2
Roaded / Natural (hectares)	844,500	850,400	844,500	844,500	844,500	844,500	844,500	844,500
Percent Change from Current	NA	1	0	0	0	0	0	0
Percent of Region /Class Total	80.8	81.3	80.8	80.8	80.8	80.8	80.8	80.8
Columbia Plateau EEIS BLM/FS Total (hectares)	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Roaded / Natural (hectares)	79,600	79,600	79,600	79,600	79,600	79,600	79,600	79,600
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	94.6	94.6	94.6	94.6	94.6	94.6	94.6	94.6
Columbia Plateau UCRB BLM/FS Total (hectares)	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**
Columbia Plateau UCRB & EEIS FS/BLM Total (hectares)	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**

Table 6B.1 (continued)

Lower Clark Fork Ecological Reporting Unit
UCRB Management Region

BLM/FS	Current Year	1	2	3	4	5	6	7
		Alternative/Simulation year 10						
Primitive / Semi-primitive (hectares)	344,100	319,800	344,100	344,100	344,100	319,800	344,100	344,100
Percent Change from Current	NA	-7	0	0	0	-7	0	0
Percent of Region /Class Total	19.8	18.4	19.8	19.8	19.8	18.4	19.8	19.8
Roaded / Natural (hectares)	1397500	1421800	1397500	1397500	1397500	1421800	1397500	1397500
Percent Change from Current	NA	2	0	0	0	2	0	0
Percent of Region /Class Total	80.2	81.6	80.2	80.2	80.2	81.6	80.2	80.2
Lower Clark Fork UCRB BLM/FS Total (hectares)	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**
Lower Clark Fork UCRB & EEIS FS/BLM Total (hectares)	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**

Northern Cascades Ecological Reporting Unit
EEIS Management Region

BLM/FS Management Class	Current Year	1	2	3	4	5	6	7
		Alternative/Simulation year 10						
Primitive / Semi-primitive (hectares)	792,700	780,600	792,700	792,700	792,700	787,700	792,700	792,700
Percent Change from Current	NA	-2	0	0	0	-1	0	0
Percent of Region /Class Total	57	56.1	57	57	57	56.6	57	57
Roaded / Natural (hectares)	598,500	610,600	598,500	598,500	598,500	603,800	598,500	598,500
Percent Change from Current	NA	2	0	0	0	1	0	0
Percent of Region /Class Total	43	43.9	43	43	43	43.4	43	43
Northern Cascades EEIS BLM/FS Total (hectares)	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**
Northern Cascades UCRB & EEIS FS/BLM Total (hectares)	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**

Northern Glaciated Mountains Ecological Reporting Unit
EEIS Management Region

BLM/FS Management Class	Current Year	1	2	3	4	5	6	7
		Alternative/Simulation year 10						
Primitive / Semi-primitive (hectares)	90,400	88,300	90,400	90,400	90,400	88,300	90,400	90,400
Percent Change from Current	NA	-2	0	0	0	-2	0	0
Percent of Region /Class Total	15.2	14.9	15.2	15.2	15.2	14.9	15.2	15.2
Roaded / Natural (hectares)	503,500	505,600	503,500	503,500	503,500	505,600	503,500	503,500
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	84.8	85.1	84.8	84.8	84.8	85.1	84.8	84.8

Table 6B.1 (continued)

Northern Glaciated Mountains Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Northern Glaciated Mountains EEIS BLM/FS Total (hectares)	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	846,000	817,600	846,000	846,000	846,000	820,700	846,000	846,000
Percent Change from Current	NA	-3	0	0	0	-3	0	0
Percent of Region /Class Total	40.3	38.9	40.3	40.3	40.3	39	40.3	40.3
Roaded / Natural (hectares)	1,255,700	1,284,100	1,255,700	1,255,700	1,255,700	1,281,000	1,255,700	1,255,700
Percent Change from Current	NA	2	0	0	0	2	0	0
Percent of Region /Class Total	59.7	61.1	59.7	59.7	59.7	61	59.7	59.7
Northern Glaciated Mountains UCRB BLM/FS Total (hectares)	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**
Northern Glaciated Mountains UCRB & EEIS FS/BLM Total (hectares)	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**

Northern Great Basin Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	1,484,900	1,477,500	1,484,900	1,484,900	1,484,900	1,484,900	1,484,900	1,484,900
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	48.5	48.2	48.5	48.5	48.5	48.5	48.5	48.5
Roaded / Natural (hectares)	1,579,700	1,587,100	1,579,700	1,579,700	1,579,700	1,579,700	1,579,700	1,579,700
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	51.5	51.8	51.5	51.5	51.5	51.5	51.5	51.5
Northern Great Basin EEIS BLM/FS Total (hectares)	**3,064,00**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**
Northern Great Basin UCRB & EEIS FS/BLM Total (hectares)	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**

Table 6B.1 (continued)

Owyhee Uplands Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class	Current Year	1	2	3	4	5	6	7
		Alternative/Simulation year 10						
Primitive / Semi-primitive (hectares)	736,800	736,800	736,800	736,800	736,800	736,800	736,800	736,800
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9
Roaded / Natural (hectares)	868,600	868,600	868,600	868,600	868,600	868,600	868,600	868,600
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	54.1	54.1	54.1	54.1	54.1	54.1	54.1	54.1
Owyhee Uplands EEIS BLM/FS Total (hectares)	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**

UCRB Management Region

BLM/FS Management Class	Current Year	1	2	3	4	5	6	7
		Alternative/Simulation year 10						
Primitive / Semi-primitive (hectares)	2,375,300	2,375,300	2,375,300	2,375,300	2,375,300	2,375,300	2,375,300	2,375,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	66.2	66.2	66.2	66.2	66.2	66.2	66.2	66.2
Roaded / Natural (hectares)	1,214,400	1,214,400	1,214,400	1,214,400	1,214,400	1,214,400	1,214,400	1,214,400
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	33.8	33.8	33.8	33.8	33.8	33.8	33.8	33.8
Owyhee Uplands UCRB BLM/FS Total (hectares)	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**
Owyhee Uplands UCRB & EEIS FS/BLM Total (hectares)	**5,195,100**	**5,195,100**	**5,,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**

Snake Headwaters Ecological Reporting Unit

UCRB Management Region

BLM/FS Management Class	Current Year	1	2	3	4	5	6	7
		Alternative/Simulation year 10						
Primitive / Semi-primitive (hectares)	172,000	171,800	172,000	172,000	172,000	172,000	172,000	172,000
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	57.3	57.2	57.3	57.3	57.3	57.3	57.3	57.3
Roaded / Natural (hectares)	128,000	128,200	128,000	128,000	128,000	128,000	128,000	128,000
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	42.7	42.7	42.7	42.7	42.7	42.7	42.7	42.7
Rural / Urban (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0

Table 6B.1 (continued)

Snake Headwaters Ecological Reporting Unit UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Snake Headwaters UCRB BLM/FS Total (hectares)	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**
Snake Headwaters UCRB & EEIS FS/BLM Total (hectares)	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**

Southern Cascades Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	219,600	181,100	219,600	219,600	219,600	189,500	219,600	219,600
Percent Change from Current	NA	-18	0	0	0	-14	0	0
Percent of Region /Class Total	27.6	22.8	27.6	27.6	27.6	23.8	27.6	27.6
Roaded / Natural (hectares)	576,100	614,600	576,100	576,100	576,100	606,200	576,100	576,100
Percent Change from Current	NA	7	0	0	0	5	0	0
Percent of Region /Class Total	72.4	77.2	72.4	72.4	72.4	76.2	72.4	72.4
Rural / Urban (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0
Southern Cascades EEIS BLM/FS Total (hectares)	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**
Southern Cascades UCRB & EEIS FS/BLM Total (hectares)	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**

Upper Clark Fork Ecological Reporting Unit UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	714,000	684,300	714,000	714,000	714,000	714,000	714,000	714,000
Percent Change from Current	NA	-4	0	0	0	0	0	0
Percent of Region /Class Total	58	55.6	58	58	58	58	58	58
Roaded / Natural (hectares)	517,700	547,400	517,700	517,700	517,700	517,700	517,700	517,700
Percent Change from Current	NA	6	0	0	0	0	0	0
Percent of Region /Class Total	42	44.4	42	42	42	42	42	42
Upper Clark Fork UCRB BLM/FS Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**
Upper Clark Fork UCRB & EEIS FS/BLM Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**

Table 6B.1 (continued)

Upper Klamath Ecological Reporting Unit EEIS Management Region BLM/FS Management Class		Alternative/Simulation year 10						
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	140,800	116,100	140,800	140,800	140,800	140,800	140,800	140,800
Percent Change from Current	NA	-18	0	0	0	0	0	0
Percent of Region /Class Total	19.2	15.8	19.2	19.2	19.2	19.2	19.2	19.2
Roaded / Natural (hectares)	592,400	617,100	592,400	592,400	592,400	592,400	592,400	592,400
Percent Change from Current	NA	4	0	0	0	0	0	0
Percent of Region /Class Total	80.8	84.2	80.8	80.8	80.8	80.8	80.8	80.8
Upper Klamath EEIS BLM/FS Total (hectares)	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**
Upper Klamath UCRB & EEIS FS/BLM Total (hectares)	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**

Upper Snake Ecological Reporting Unit UCRB Management Region BLM/FS Management Class		Alternative/Simulation year 10						
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	846,300	846,300	846,300	846,300	846,300	846,300	846,300	846,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	62.3	62.3	62.3	62.3	62.3	62.3	62.3	62.3
Roaded / Natural (hectares)	513,100	513,100	513,100	513,100	513,100	513,100	513,100	513,100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7
Upper Snake UCRB BLM/FS Total (hectares)	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**
Upper Snake UCRB & EEIS FS/BLM Total (hectares)	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**
Grand Total of UCRB & EEIS BLM/FS Lands (hectares)	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**

[1]Planning Area: EEIS BLM/FS–Eastern Oregon and Washington, BLM and FS-administered lands only; UCRB BLM/FS–Upper Columbia River Basin, BLM and FS-administered lands only.

[2]The "current year" data portrayed in this table is from an early version of the alternatives (preliminary draft Environmental Impact Statements, fall 1995). Due to changes in the look up tables (classification of cover types to cover type codes) used for the latest CRBSUM model vegetation predictions, the current year baseline was changed when the model was initialized. However, this new modeled current year will not be reported since this would change the baseline and many other analyses that have already been completed. The project time line did not allow sufficient time to redo all previous work. The overall impact of using the old current baseline is that differences between alternatives and current hectares may appear to be larger than they should be.

[3]hectare=2.47 acres

[4]NA=Not Applicable

Table 6B.2. Scenic integrity classes for EEIS and UCRB BLM/FS[1]-administered lands by Ecological Reporting Unit (ERU), management region, management class, and simulation year 10.

Entire EEIS Management Region

BLM/FS Management Class	Current Year[2]	1	2	3	4	5	6	7
		Alternative/Simulation year 10						
Agricultural/Developed Lands[3] (hectares[4])	100	100	100	100	100	100	100	100
Percent Change from Current	NA[5]	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0
Very High Scenic Integrity (hectares)	2,877,600	2,971,800	3,042,000	3,005,600	3,005,000	2,98,800	3,008,100	3,041,500
Percent of Change from Current	NA	3	6	4	4	4	5	6
Percent of Region /Class Total	19.1	25.3	25.8	25.5	25.5	25.3	25.6	25.8
High Scenic Integrity (hectares)	2,246,600	2,129,000	2,089,500	3,417,300	3,419,000	2,118,200	2,208,600	3,558,500
Percent of Change from Current	NA	-5	-7	52	52	-6	-2	58
Percent of Region /Class Total	19.1	18.1	17.8	29.0	29.1	18.0	18.8	30.2
Moderately High Scenic Integrity (hectares)	5,003,300	4,926,800	4,927,800	4,233,800	4,552,100	4,946,800	4,896,900	4,166,500
Percent Change from Current	NA	-2	-2	-15	-9	-1	-2	-17
Percent of Region /Class Total	42.5	41.9	41.9	36.0	38.7	42.0	41.6	35.4
Moderately Low Scenic Integrity (hectares)	1,478,300	1,537,700	1,52,200	983,600	686,000	1,526,300	1471,100	891,500
Percent Change from Current	NA	4	3	-33	-54	3	0	-40
Percent of Region /Class Total	12.6	13.1	13.0	8.4	5.8	13.0	12.5	7.6
Low Scenic Integrity (hectares)	162,600	203,100	184,900	128,100	106,300	195,300	183,700	110,400
Percent Change from Current	NA	25	14	-21	-35	20	13	-32
Percent of Region /Class Total	1.4	1.7	1.6	1.1	0.9	1.7	1.6	0.9
BLM/FS EEIS TOTAL (hectares)	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,786,500**

Entire UCRB Management Region

BLM/FS Management Class	Current Year[2]	1	2	3	4	5	6	7
		Alternative/Simulation year 10						
Agricultural/Developed Lands (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Very High Scenic Integrity (hectares)	6,049,100	6,094,100	6,179,200	6,028,500	5,026,500	6,045,300	6,096,400	6,209,500
Percent Change from Current	NA	1	2	0	0	0	1	3
Percent of Region /Class Total	35.6	35.9	36.4	35.5	35.5	35.6	35.9	36.6
High Scenic Integrity (hectares)	5,343,800	5,199,900	5,178,800	5,347,900	5,359,600	5,236,700	5,572,000	5,613,900
Percent Change from Current	NA	-3	-3	0	0	-2	4	5
Percent of Region /Class Total	31.5	30.6	30.5	31.5	31.6	30.8	32.8	33.1

Table 6B.2 (continued)

Entire UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year[2]	1	2	3	4	5	6	7
Moderately High Scenic Integrity (hectares)	4,439,700	4,342,800	4,375,700	4,309,700	4,334,200	4,384,400	4,173,800	4,126,700
Percent Change from Current	NA	-2	-1	-3	-2	-1	-6	-7
Percent of Region /Class Total	26.1	25.6	25.8	25.4	25.5	25.8	24.6	24.3
Moderately Low Scenic Integrity (hectares)	974,000	1,144,500	1,060,500	1,099,500	1,069,200	1,116,900	963,600	869,000
Percent Change from Current	NA	18	9	13	10	15	-1	-11
Percent of Region /Class Total	5.7	6.7	6.2	6.5	6.3	6.6	5.7	5.1
Low Scenic Integrity (hectares)	172,000	197,300	184,400	193,000	189,100	195,300	172,800	159,500
Percent Change from Current	NA	15	7	12	10	14	0	-7
Percent of Region /Class Total	1.0	1.2	1.1	1.1	1.1	1.2	1.0	0.9
BLM/FS UCRB TOTAL (hectares)	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**
Grand Total EEIS & UCRB BLM/FS Lands (hectares)	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**

Blue Mountains Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	577,400	580,800	598,100	579,400	579,400	579,800	580,800	591,300
Percent Change from Current	NA	1	4	0	0	0	1	2
Percent of Region /Class Total	22.8	23.0	23.6	22.9	22.9	22.9	23.0	23.4
High Scenic Integrity (hectares)	495,600	479,300	468,700	1165,600	1165,700	479,400	484,900	1,186,200
Percent Change from Current	NA	-3	-5	135	135	-3	-2	139
Percent of Region /Class Total	19.6	18.9	18.5	46.1	46.1	19.0	19.2	46.9
Moderately High Scenic Integrity (hectares)	1,016,700	1,012,400	1,009,200	658,300	668,000	1,012,400	1,011,600	642,300
Percent Change from Current	NA	0	-1	-35	-34	0	-1	-37
Percent of Region /Class Total	40.2	40.0	39.9	26.0	26.4	40.0	40.0	25.4
Moderately Low Scenic Integrity (hectares)	400,600	404,900	409,000	106,400	97,400	405,600	401,300	91,900
Percent Change from Current	NA	1	2	-73	-76	1	0	-77
Percent of Region /Class Total	15.8	16.0	16.2	4.2	3.9	16.0	15.9	3.6
Low Scenic Integrity (hectares)	39,500	52,400	44,800	20,100	19,300	52,600	51,200	18,100
Percent Change from Current	NA	33	13	-49	-51	33	30	-54
Percent of Region /Class Total	1.6	2.1	1.8	0.8	0.8	2.1	2.0	0.7
Blue Mountains EEIS BLM/FS Total (hectares)	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**

Table 6B.2 (continued)

UCRB Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	43,600	44,200	44,500	44,000	44,000	44,000	44,300	44,500
Percent Change from Current	NA	1	2	1	1	1	2	2
Percent of Region /Class Total	40.3	40.9	41.2	40.7	40.7	40.7	41.0	41.2
High Scenic Integrity (hectares)	17,100	16,500	16,800	16,400	16,400	16,400	16,400	16,700
Percent Change from Current	NA	-4	-2	-4	-4	-4	-4	-2
Percent of Region /Class Total	15.8	15.3	15.5	15.2	15.2	15.2	15.2	15.4
Moderately High Scenic Integrity (hectares)	27,900	28,700	27,800	28,000	28,000	28,000	27,700	27,900
Percent Change from Current	NA	3	0	0	0	0	-1	0
Percent of Region /Class Total	25.8	26.5	25.7	25.9	25.9	25.9	25.6	25.8
Moderately Low Scenic Integrity (hectares)	17,500	16,700	16,900	17,500	17,500	17,500	17,500	17,100
Percent Change from Current	NA	-5	-3	0	0	0	0	-2
Percent of Region /Class Total	16.2	15.4	15.6	16.25	16.2	16.2	16.2	15.8
Low Scenic Integrity (hectares)	2,000	2,000	2,100	2,200	2,200	2,200	2,200	1,900
Percent Change from Current	NA	0	5	10	10	10	10	-5
Percent of Region /Class Total	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.8
Blue Mountains UCRB BLM/FS Total (hectares)	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**
Blue Mountains UCRB & EEIS FS/BLM Total (hectares)	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**

Central Idaho Mountains Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	4,900	5,700	5,600	5,100	5,100	5,100	5,100	5,100
Percent Change from Current	NA	16	14	4	4	4	4	4
Percent of Region /Class Total	54.4	63.3	62.2	56.7	56.7	56.7	56.7	56.7
High Scenic Integrity (hectares)	3,500	2,700	2,800	3,300	3,300	3,300	3,900	3,900
Percent Change from Current	NA	-23	-20	-6	-6	-6	11	11
Percent of Region /Class Total	38.9	30.0	31.1	36.7	36.7	36.7	43.3	43.3
Moderately High Scenic Integrity (hectares)	600	600	600	600	600	600	0	0
Percent Change from Current	NA	0	0	0	0	0	-100	-100
Percent of Region /Class Total	6.7	6.7	6.7	6.7	6.7	6.7	0.0	0.0
Moderately Low Scenic Integrity (hectares)	0	0	0	0	0	0	0	0
Percent Change from Current	0	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0
Central Idaho Mountains EEIS BLM/FS Total (hectares)	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**

Table 6B.2 (continued)

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	2,908,500	3,040,300	3,049,100	2,950,800	2,950,000	2,986,400	2,994,200	3,061,200
Percent Change from Current	NA	5	5	1	1	3	3	5
Percent of Region /Class Total	45	47	47.2	45.7	45.6	46.2	46.3	47.4
High Scenic Integrity (hectares)	2,250,500	2,101,100	2,113,500	2,209,200	2,209,800	2,149,000	2,324,700	2,326,500
Percent Change from Current	NA	-7	-6	-2	-2	-5	3	3
Percent of Region /Class Total	34.8	32.5	32.7	34.2	34.2	33.3	36	36
Moderately High Scenic Integrity (hectares)	983,900	968,000	96,600	962,300	962,000	979,400	860,800	818,800
Percent Change from Current	NA	-2	-1	-2	-2	0	-13	-17
Percent of Region /Class Total	15.2	15	15	14.9	14.9	15.2	13.3	12.7
Moderately Low Scenic Integrity (hectares)	27,500	304,500	28,5700	292,000	292,400	298,800	241,900	219,200
Percent Change from Current	NA	9	0	8	8	10	-8	-18
Percent of Region /Class Total	4.3	4.7	4.4	4.5	4.5	4.6	3.7	3.4
Low Scenic Integrity (hectares)	44,400	48,400	44,400	48,000	48,100	48,700	40,700	36,600
Percent Change from Current	NA	9	0	8	8	10	-8	-18
Percent of Region /Class Total	0.7	0.7	0.7	0.7	0.7	0.8	0.6	0.6
Central Idaho Mountains UCRB BLM/FS Total (hectares)	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**
Central Idaho Mountains UCRB & EEIS FS/BLM Total (hectares)	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**

Columbia Plateau Ecological Reporting Unit

EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	171,300	168,900	172,300	171,300	171,500	171,600	172,300	172,300
Percent Change from Current	NA	-1	1	0	0	0	1	1
Percent of Region /Class Total	16.4	16.2	16.5	16.4	16.4	16.4	16.5	16.5
High Scenic Integrity (hectares)	68,400	78,400	66,600	135,800	135,700	67,100	67,600	138,200
Percent Change from Current	NA	15	-3	99	98	-2	-1	102
Percent of Region /Class Total	6.5	7.5	6.4	13	13	6.45	6.5	13.2
Moderately High Scenic Integrity (hectares)	419,200	403,200	408,600	373,200	656,000	411,000	409,800	376,600
Percent Change from Current	NA	-4	-3	-11	56	-2	-2	-10
Percent of Region /Class Total	40.1	38.6	39.1	35.7	62.7	39.3	39.2	36
Moderately Low Scenic Integrity (hectares)	358,300	366,000	369,000	340,400	77,900	366,300	367,400	334,700
Percent Change from Current	NA	2	3	-5	-78	2	3	-7
Percent of Region /Class Total	34.3	35	35.3	32.6	7.5	35	35.1	32

Table 6B.2 (continued)

Columbia Plateau Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

		Alternative/Simulation year 10						
	Current Year	1	2	3	4	5	6	7
Low Scenic Integrity (hectares)	28,400	29,100	29,100	24,900	4,500	29,600	28,500	23,800
Percent Change from Current	NA	2	2	-12	-84	4	0	-16
Percent of Region /Class Total	2.7	2.8	2.8	2.4	0.4	2.8	2.7	2.3
Columbia Plateau EEIS BLM/FS Total (hectares)	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**

UCRB Management Region
BLM/FS Management Class

		Alternative/Simulation year 10						
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	3,900	3,900	3,900	3,900	3,900	3,900	3,900	3,900
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
High Scenic Integrity (hectares)	1,500	1,600	1,500	1,400	1,400	1,400	40,300	4,400
Percent Change from Current	NA	7	0	-7	-7	-7	2587	2833
Percent of Region /Class Total	1.8	1.9	1.8	1.7	1.7	1.7	47.9	52.3
Moderately High Scenic Integrity (hectares)	61,000	56,200	58,900	56,300	56,300	56,200	33,700	31,100
Percent Change from Current	NA	-8	-3	-8	-8	-8	-45	-49
Percent of Region /Class Total	72.5	66.8	70	66.9	66.9	66.8	40.1	37
Moderately Low Scenic Integrity (hectares)	1,500	18,700	16,600	18,900	18,900	19,000	4,800	3,600
Percent Change from Current	NA	25	11	26	26	27	-68	-76
Percent of Region /Class Total	17.8	22.2	19.7	22.5	22.5	22.6	5.7	4.3
Low Scenic Integrity (hectares)	2,700	3,700	3,200	3,600	3,600	3,600	1,400	1,500
Percent Change from Current	NA	37	19	33	33	33	-48	-44
Percent of Region /Class Total	3.2	4.4	3.8	4.3	4.3	4.3	1.7	1.8
Columbia Plateau UCRB BLM/FS Total (hectares)	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**
Columbia Plateau UCRB & EEIS FS/BLM Total (hectares)	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**

Lower Clark Fork Ecological Reporting Unit
UCRB Management Region
BLM/FS Management Class

		Alternative/Simulation year 10						
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	227,500	222,800	241,800	236,600	236,600	222,200	240,600	243,300
Percent Change from Current	NA	-2	6	4	4	-2	6	7
Percent of Region /Class Total	13.1	12.8	13.9	13.6	13.6	12.8	13.8	14

Table 6B.2 (continued)

Lower Clark Fork Ecological Reporting Unit
UCRB Management Region
BLM/FS Management Class

		Alternative/Simulation year 10						
	Current Year	1	2	3	4	5	6	7
High Scenic Integrity (hectares)	404,300	380,600	382,500	377,900	382,400	383,200	378,400	390,600
Percent Change from Current	NA	-6	-5	-7	-5	-5	-6	-3
Percent of Region /Class Total	23.2	21.9	22	21.7	22	22	21.7	22.4
Moderately High Scenic Integrity (hectares)	878,400	835,000	855,600	829,300	846,500	837,600	846,900	863,400
Percent Change from Current	NA	-5	-3	-6	-4	-5	-4	-2
Percent of Region /Class Total	50.4	47.9	49.1	47.6	48.6	48.1	48.6	49.6
Moderately Low Scenic Integrity (hectares)	213,200	280,900	240,800	272,900	253,600	273,500	253,300	225,400
Percent Change from Current	NA	32	13	28	19	28	19	6
Percent of Region /Class Total	12.2	16.1	13.8	15.7	14.6	15.7	14.5	12.9
Low Scenic Integrity (hectares)	18,200	22,300	20,900	24,900	22,500	25,100	22,400	18,900
Percent Change from Current	NA	23	15	37	24	38	23	4
Percent of Region /Class Total	1	1.3	1.2	1.4	1.3	1.4	1.3	1.1
Lower Clark Fork UCRB BLM/FS Total (hectares)	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**
Lower Clark Fork UCRB & EEIS FS/BLM Total (hectares)	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**

Northern Cascades Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

		Alternative/Simulation year 10						
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	367,300	516,600	513,800	504,300	504,300	502,100	505,300	517,200
Percent Change from Current	NA	41	40	37	37	37	38	41
Percent of Region /Class Total	26.4	37.1	36.9	36.2	36.2	36.1	36.3	37.2
High Scenic Integrity (hectares)	582,100	442,800	451,500	458,200	458,400	456,800	475,900	467,400
Percent Change from Current	NA	-24	-22	-21	-21	-22	-18	-20
Percent of Region /Class Total	26.4	37.1	36.9	36.2	36.2	36.1	36.3	37.2
Moderately High Scenic Integrity (hectares)	301,400	305,600	307,900	301,000	301,100	304,900	299,400	299,400
Percent Change from Current	NA	1	2	0	0	1	-1	-1
Percent of Region /Class Total	21.7	22.0	22.1	21.6	21.6	21.9	21.5	21.5
Moderately Low Scenic Integrity (hectares)	127,600	113,500	108,000	115,900	115,600	115,500	100,700	99,200
Percent Change from Current	NA	-11	-15	-9	-9	-9	-21	-22
Percent of Region /Class Total	9.2	8.2	7.8	8.3	8.3	8.3	7.2	7.1
Low Scenic Integrity (hectares)	12,800	12,700	10,000	11,800	11,800	11,900	9,900	8,000
Percent Change from Current	NA	-1	-22	-8	-8	-7	-23	-38
Percent of Region /Class Total	0.9	0.9	0.7	0.8	0.8	0.9	0.7	0.6

Table 6B.2 (continued)

Northern Cascades Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Northern Cascades EEIS BLM/FS Total (hectares)	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**
Northern Cascades UCRB & EEIS FS/BLM Total (hectares)	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**

Northern Glaciated Mountains Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	71,600	69,000	71,000	72,000	71,300	69,000	71,400	71,800
Percent Change from Current	NA	-4	-1	-1	0	-4	0	0
Percent of Region /Class Total	12.1	11.6	12.0	12.1	12.0	11.6	12.0	12.1
High Scenic Integrity (hectares)	85,700	82,100	85,700	83,700	84,400	84,600	86,300	88,100
Percent Change from Current	NA	-4	0	-2	-1	-1	1	3
Percent of Region /Class Total	14.4	13.8	14.4	14.1	14.3	14.2	14.5	14.8
Moderately High Scenic Integrity (hectares)	299,400	285,000	289,700	292,900	294,300	291,300	293,100	304,400
Percent Change from Current	NA	-5	-3	-25	-2	-3	-2	2
Percent of Region /Class Total	50.4	48.0	48.8	49.3	49.6	49.0	49.4	51.3
Moderately Low Scenic Integrity (hectares)	126,100	144,200	135,300	133,000	131,000	136,500	130,900	120,200
Percent Change from Current	NA	14	7	5	4	8	45	-5
Percent of Region /Class Total	21.2	24.3	22.8	22.4	22.1	23.0	22.0	20.2
Low Scenic Integrity (hectares)	11,100	13,600	12,200	12,300	12,500	12,500	12,200	9,400
Percent Change from Current	NA	23	10	11	13	13	10	-15
Percent of Region /Class Total	1.9	2.3	2.1	2.1	2.1	2.1	2.1	1.6
Northern Glaciated Mountains EEIS BLM/FS Total (hectares)	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	728,800	697,900	727,100	707,000	707,000	701,100	72,1100	727900
Percent Change from Current	NA	-4	0	-3	-3	-4	-1	0
Percent of Region /Class Total	34.7	33.2	34.6	33.6	33.6	33.4	34.3	34.6

Table 6B.2 (continued)

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
High Scenic Integrity (hectares)	357,600	357,300	340,000	361,200	368,000	348,200	379,000	385,500
Percent Change from Current	NA	0	-5	1	3	-3	6	8
Percent of Region /Class Total	17.0	17.0	16.2	17.2	17.5	16.6	18.0	18.3
Moderately High Scenic Integrity (hectares)	740,100	696,600	711,200	706,300	713,700	722,800	697,200	720,200
Percent Change from Current	NA	-6	-4	-5	-4	-2	-6	-3
Percent of Region /Class Total	35.2	33.1	33.8	33.6	34.0	34.4	33.2	34.3
Moderately Low Scenic Integrity (hectares)	248,900	310,000	289,700	293,900	281,400	294,900	273,400	242,400
Percent Change from Current	NA	25	16	18	13	18	10	-3
Low Scenic Integrity (hectares)	26,300	39,900	33,700	33,300	31,600	34,700	31,000	25,700
Percent Change from Current	NA	52	28	27	20	32	18	-2
of Region /Class	1.3	1.9	1.6	1.6	1.5	1.7	1.5	1.2
Northern Glaciated Mountains UCRB BLM/FS Total (hectares)	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**
Northern Glaciated Mountains UCRB & EEIS FS/BLM Total (hectares)	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**

Northern Great Basin Ecological Reporting Unit

EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	861,600	854,000	860,200	858,800	858,700	858,700	858,600	860,600
Percent Change from Current	NA	-1	0	0	0	0	0	0
Percent of Region /Class Total	28.1	27.9	28.1	28.0	28.0	28.0	28.0	28.1
High Scenic Integrity (hectares)	652,400	655,100	652,100	749,000	749,100	652,700	652,900	761,600
Percent Change from Current	NA	0	0	15	15	0	0	17
Percent of Region /Class Total	21.3	21.4	21.3	24.4	24.4	21.3	21.3	24.9
Moderately High Scenic Integrity (hectares)	1,391,200	1,376,600	1,378,600	1,345,200	1,345,200	1,376,400	1,375,600	1,334,400
Percent Change from Current	NA	-1	-1	-3	-3	-1	-1	-4
Percent of Region /Class Total	45.4	44.9	45.0	43.9	43.9	44.9	44.9	43.5
Moderately Low Scenic Integrity (hectares)	121,100	134,700	128,500	79,800	79,800	134,100	134,500	76,000
Percent Change from Current	NA	11	6	-34	-34	11	11	-37
Percent of Region /Class Total	4.0	4.4	4.2	2.6	2.6	4.4	4.4	2.5
Low Scenic Integrity (hectares)	38,300	44,200	45,200	31,800	31,800	42,700	43,000	32,000
Percent Change from Current	NA	15	18	-17	-17	11	12	-16
Percent of Region /Class Total	1.2	1.4	1.5	1.0	1.0	1.4	1.4	1.0

Table 6B.2 (continued)

Northern Great Basin Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

		Alternative/Simulation year 10						
	Current Year	1	2	3	4	5	6	7
Northern Great Basin EEIS BLM/FS Total (hectares)	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**
Northern Great Basin UCRB and EEIS FS/BLM Total (hectares)	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**

Owyhee Uplands Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

		Alternative/Simulation year 10						
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	549,300	549,300	549,100	549,300	549,300	549,300	549,300	549,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	34.2	34.2	34.2	34.2	34.2	34.2	34.2	34.2
High Scenic Integrity (hectares)	189,800	189,600	190,100	193,100	193,100	189,800	189,700	193,100
Percent Change from Current	NA	0	0	2	2	0	0	2
Percent of Region /Class Total	11.8	11.8	11.8	12.0	12.0	11.8	11.8	12.0
Moderately High Scenic Integrity (hectares)	848,300	848,700	848,700	845,200	845,200	848,500	848,500	845,200
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	52.8	52.9	52.9	52.6	52.6	52.9	52.9	52.6
Moderately Low Scenic Integrity (hectares)	12,900	12,700	12,400	12,700	12,700	12,700	12,800	12,700
Percent Change from Current	NA	-2	-4	-2	-2	-2	-1	-2
Percent of Region /Class Total	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Low Scenic Integrity (hectares)	5,100	5,100	5,100	5,100	5,100	5,100	5,100	5,100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Owyhee Uplands EEIS BLM/FS Total (hectares)	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**

UCRB Management Region
BLM/FS Management Class

		Alternative/Simulation year 10						
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	929,300	928,900	929,300	928,900	928,900	929,100	929,200	929,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9

Table 6B.2 (continued)

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
High Scenic Integrity (hectares)	1,459,700	1,458,900	1,459,700	1,460,000	1,460,000	1,458,700	1,459,500	1,458,900
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	40.7	40.6	40.7	40.7	40.7	40.6	40.7	40.6
Moderately High Scenic Integrity (hectares)	1,073,400	1,074,200	1,073,300	1,072,900	1,073,000	1,074,000	1,073,100	1,074,000
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9
Moderately Low Scenic Integrity (hectares)	78,400	78,800	78,500	79,000	78,900	79,000	79,000	78,600
Percent Change from Current	NA	1	0	1	1	1	1	0
Percent of Region /Class Total	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Low Scenic Integrity (hectares)	4,8900	48,900	48,900	48,900	48,900	48,900	48,900	489,00
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Owyhee Uplands UCRB BLM/FS Total (hectares)	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**
Owyhee Uplands UCRB EEIS FS/BLM Total (hectares)	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**

Snake Headwaters Ecological Reporting Unit

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Agricultural/Developed Lands (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0
Very High Scenic Integrity (hectares)	153,700	144,400	145,200	146,100	144,800	145,500	145,800	147,000
Percent Change from Current	NA	-6	-6	-5	-6	-5	-5	-4
Percent of Region /Class Total	51.2	48.1	48.45	48.7	48.3	48.5	48.6	49.0
High Scenic Integrity (hectares)	85,700	90,900	91,900	91,100	91,000	89,900	88,300	89,600
Percent Change from Current	NA	6	7	6	6	5	3	5
Percent of Region /Class Total	28.6	30.3	30.6	30.4	30.3	30.0	29.4	29.9
Moderately High Scenic Integrity (hectares)	50,200	52,000	50,000	49,800	50,500	51,600	51,900	50,500
Percent Change from Current	NA	4	0	-1	1	3	3	1
Percent of Region /Class Total	16.7	17.3	16.7	16.6	16.8	17.2	17.3	16.8
Moderately Low Scenic Integrity (hectares)	9,400	11,400	11,700	11,500	12,300	11,700	12,900	11,800
Percent Change from Current	NA	21	24	22	31	24	37	26
Percent of Region /Class Total	3.1	3.8	3.9	3.8	4.1	3.9	4.3	3.9

Table 6B.2 (continued)

Snake Headwaters Ecological Reporting Unit UCRB Management Region BLM/FS Management Class		Alternative/Simulation year 10						
	Current Year	1	2	3	4	5	6	7
Low Scenic Integrity (hectares)	1,000	1,300	1,200	1,500	1,400	1,300	1,100	1,100
Percent Change from Current	NA	30	20	50	40	30	10	10
Percent of Region /Class Total	0.3	0.4	0.4	0.5	0.5	0.4	0.4	0.4
Snake Headwaters UCRB BLM/FS Total (hectares)	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**
Snake Headwaters UCRB & EEIS FS/BLM Total (hectares)	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**

Southern Cascades Ecological Reporting Unit UCRB Management Region BLM/FS Management Class		Alternative/Simulation year 10						
	Current Year	1	2	3	4	5	6	7
Agricultural/Developed Lands (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0
Very High Scenic Integrity (hectares)	149,000	131,600	155,000	151,400	151,400	132,200	151,200	155,400
Percent Change from Current	NA	-12	4	2	2	-11	1	4
Percent of Region /Class Total	18.7	16.5	19.5	19.0	19.0	16.6	19.0	19.5
High Scenic Integrity (hectares)	102,200	111,100	99,000	206,900	207,200	110,000	161,600	270,200
Percent Change from Current	NA	9	-3	102	103	8	58	164
Percent of Region /Class Total	12.8	14.0	12.4	26.0	26.0	13.8	20.3	34.0
Moderately High Scenic Integrity (hectares)	319,300	310,800	299,400	269,300	268,400	318,600	280,000	237,800
Percent Change from Current	NA	-3	-6	-16	-16	0	-12	-26
Percent of Region /Class Total	40.1	39.1	37.6	33.8	33.7	40.0	35.2	29.9
Moderately Low Scenic Integrity (hectares)	202,900	206,700	211,800	150,100	150,700	204,100	177,700	120,900
Percent Change from Current	NA	2	4	-26	-26	1	-12	-40
Percent of Region /Class Total	25.5	26.0	26.6	18.9	18.9	25.6	22.3	15.2
Low Scenic Integrity (hectares)	22,300	35,500	30,500	18,000	18,000	30,800	25,200	11,400
Percent Change from Current	NA	59	37	-19	-19	38	13	-49
Percent of Region /Class Total	2.8	4.5	3.8	2.3	2.3	3.9	3.2	1.4
Southern Cascades EEIS BLM/FS Total (hectares)	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**
Southern Cascades UCRB & EEIS FS/BLM Total (hectares)	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**

Table 6B.2 (continued)

Upper Clark Fork Ecological Reporting Unit
UCRB Management Region
BLM/FS Management Class

	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	603,400	564,400	589,000	562,100	562,100	563,800	567,900	603,900
Percent Change from Current	NA	-6	-2	-7	-7	-7	-6	0
Percent of Region /Class Total	49.0	45.8	47.8	45.6	45.6	45.8	46.1	49.0
High Scenic Integrity (hectares)	355,400	378,900	360,500	417,600	417,600	377,100	472,800	489,200
Percent Change from Current	NA	7	1	18	18	6	33	38
Percent of Region /Class Total	28.9	30.8	29.3	33.9	33.9	30.6	38.4	39.7
Moderately High Scenic Integrity (hectares)	207,800	214,800	212,600	187,900	187,900	217,700	165,900	124,000
Percent Change from Current	NA	3	2	-10	-10	5	-20	-40
Percent of Region /Class Total	16.9	17.4	17.3	15.3	15.3	17.7	13.5	10.1
Moderately Low Scenic Integrity (hectares)	60,400	66,600	63,500	57,300	57,300	66,100	24,000	13,700
Percent Change from Current	NA	10	5	-5	-5	9	-60	-77
Percent of Region /Class Total	4.9	5.4	5.2	4.7	4.7	5.4	1.9	1.1
Low Scenic Integrity (hectares)	4,700	7,000	6,100	6,800	6,800	7,000	1,100	900
Percent Change from Current	NA	49	30	45	45	49	-77	-81
Percent of Region /Class Total	0.4	0.6	0.5	0.6	0.6	0.6	0.1	0.1
Upper Clark Fork UCRB BLM/FS Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**
Upper Clark Fork UCRB & EEIS FS/BLM Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**

Upper Klamath Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	603,400	564,400	589,000	562,100	562,100	563,800	567,900	603,900
Percent Change from Current	NA	-6	-2	-7	-7	-7	-6	0
Percent of Region /Class Total	49.0	45.8	47.8	45.6	45.6	45.8	46.1	49.0
High Scenic Integrity (hectares)	355,400	378,900	360,500	417,600	417,600	377,100	472,800	489,200
Percent Change from Current	NA	7	1	18	18	6	33	38
Percent of Region /Class Total	28.9	30.8	29.3	33.9	33.9	30.6	38.4	39.7
Moderately High Scenic Integrity (hectares)	207,800	214,800	212,600	187,900	187,900	217,700	165,900	124,000
Percent Change from Current	NA	3	2	-10	-10	5	-20	-40
Percent of Region /Class Total	16.9	17.4	17.3	15.3	15.3	17.7	13.5	10.1
Moderately Low Scenic Integrity (hectares)	60,400	66,600	63,500	57,300	57,300	66,100	24,000	13,700
Percent Change from Current	NA	10	5	-5	-5	9	-60	-77
Percent of Region /Class Total	4.9	5.4	5.2	4.7	4.7	5.4	1.9	1.1

Table 6B.2 (continued)

Upper Klamath Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Low Scenic Integrity (hectares)	4,700	7,000	6,100	6,800	6,800	7,000	1,100	900
Percent Change from Current	NA	49	305	45	45	49	-77	-81
Percent of Region /Class Total	0.4	0.6	0.5	0.6	0.6	0.6	0.1	0.1
Upper Clark Fork UCRB BLM/FS Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**
Upper Clark Fork UCRB & EEIS FS/BLM Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**

Upper Klamath Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	125,200	95,900	116,900	114,000	114,000	114,000	114,100	118,500
Percent Change from Current	NA	-23	-7	-9	-9	-9	-9	-5
Percent of Region /Class Total	17.1	13.15	15.9	15.5	15.55	15.55	15.6	16.2
High Scenic Integrity (hectares)	66,900	87,900	73,000	421,700	421,700	74,500	85,800	449,800
Percent Change from Current	NA	31	9	530	530	11	28	572
Percent of Region /Class Total	9.1	12.0	10.0	57.5	57.5	10.2	11.75	61.3
Moderately High Scenic Integrity (hectares)	407,200	383,900	385,100	148,100	173,300	383,100	378,900	126,400
Percent Change from Current	NA	-6	-5	-64	-57	-6	-7	-69
Percent of Region /Class Total	55.5	52.4	52.5	20.2	23.6	52.3	51.7	17.2
Moderately Low Scenic Integrity (hectares)	128,800	155,000	150,200	45,300	20,900	151,500	145,800	35,900
Percent Change from Current	NA	20	17	-65	-84	18	13	-72
Percent of Region /Class Total	17.6	21.1	20.5	6.2	2.9	20.7	19.9	4.9
Low Scenic Integrity (hectares)	5,100	10,500	8,000	4,100	3,300	10,100	8,600	2,600
Percent Change from Current	NA	106	57	-20	-35	98	69	-49
Percent of Region /Class Total	0.7	1.4	1.1	0.6	0.5	1.4	1.2	0.4
Upper Klamath EEIS BLM/FS Total (hectares)	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**
Upper Klamath UCRB & EEIS FS/BLM Total (hectares)	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**

Table 6B.2 (continued)

Upper Snake Ecological Reporting Unit UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	450,400	447,300	449,300	449,100	449,200	449,300	449,400	448,500
Percent Change from Current	NA	-1	0	0	0	0	0	0
Percent of Region /Class Total	33.1	32.9	33.1	33.0	33.0	33.1	33.1	33.0
High Scenic Integrity (hectares)	412,000	414,100	412,400	413,100	413,000	412,800	412,600	412,900
Percent Change from Current	NA	1	0	0	0	0	0	0
Percent of Region /Class Total	30.3	30.5	30.3	30.4	30.4	30.4	30.4	30.4
Moderately High Scenic Integrity (hectares)	417,000	417,300	416,700	416,900	416,300	417,100	416,600	416,800
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	30.7	30.7	30.7	30.7	30.6	30.7	30.6	30.7
Moderately Low Scenic Integrity (hectares)	56,200	56,900	57,100	56,500	56,900	56,400	56,800	57,200
Percent Change from Current	NA	1	2	1	1	0	1	2
Percent of Region /Class Total	4.1	4.2	4.2	4.2	4.2	4.1	4.2	4.2
Low Scenic Integrity (hectares)	23,800	23,800	23,900	23,800	24,000	23,800	24,000	24,000
Percent Change from Current	NA	0	0	0	1	0	1	1
Percent of Region /Class Total	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Upper Snake UCRB BLM/FS Total (hectares)	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**
Upper Snake UCRB EEIS FS/BLM Total (hectares)	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**
Grand Total of UCRB & EEIS BLM/FS Lands (hectares)	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**

[1]Planning Areas: EEIS BLM/FS–Eastern Oregon and Washington, BLM and FS-administered lands only; UCRB BLM/FS–Upper Columbia River Basin, BLM and FS-administered lands only.

[2]The "current year" data portrayed in this table is from an early version of the alternatives (preliminary draft Environmental Impact Statements, fall 1995). Due to changes in the tables (classification of cover types to cover type codes) used for the latest CRBSUM model vegetation predictions, the current year baseline was changed when the model was initialized. However, this new modeled current year will not be reported since this would change the baseline and many other analyses that have already been completed. The project time line did not allow sufficient time to redo all previous work. The overall impact of using the old current baseline is that differences between alternatives and current hectares may appear to be larger than they should be.

[3]Agricultural / Developed Lands–include crop/hay/pasture lands in both agriculture and closed herbland structures. Physiognomic Types were used for classification in this table rather than structures, which resulted in more hectares in agriculture than was calculated in McCool and others (1996).

[4]hectare=2.47 acres

[5]NA=Not Applicable

Table 6B.3. Road Density Classes for EEIS and UCRB BLM/FS[1]-administered lands by ecological reporting unit, management region, management class, and simulation year 10. The road density predictions for the preliminary draft Environmental Impact Statements alternatives are simulations created to model Environmental Impact Statement prescriptions. They are not meant to insinuate the desired road density or infer areas for highest priority closures. Local information needs to be taken into account prior to decisions concerning road closures.

Entire EEIS Management Region BLM/FS Management Class	Current Year[2]	1	2	3	4	5	6	7
		Alternative/Simulation year 10						
None (hectares[3])	2,907,900	2,865,900	2,907,900	2,907,900	2,907,900	2,896,900	2,907,900	2,907,900
Percent Change from Current	NA[4]	-1	0	0	0	0	0	0
Percent of Region /Class Total	24.7	24.7	24.7	24.7	24.7	24.6	24.7	24.7
Very Low / Low (hectares)	1,653,900	1,586,100	1,653,900	1,653,900	1,653,900	1,627,400	1,653,900	1,653,900
Percent Change from Current	NA	-4	0	0	0	-2	0	0
Percent of Region /Class Total	14.1	13.5	14.1	14.1	14.1	13.8	14.1	14.1
Moderate (hectares)	3,237,800	3,347,600	3,237,600	4,822,800	5,140,900	3,275,300	3,367,800	4,952,800
Percent Change from Current	NA	3	0	49	59	1	4	53
Percent of Region /Class Total	27.5	28.4	27.5	41.0	43.7	27.8	28.6	42.1
High / Extremely High (hectares)	3,968,900	3,968,900	3,,968,900	2,383,900	2,065,800	3,968,900	3,838,900	2,253,900
Percent Change from Current	NA	0	0	-40	-48	0	-3	-43
Percent of Region /Class Total	33.7	33.7	33.7	20.3	17.6	33.7	32.6	19.2
BLM/FS EEIS Total (hectares)	**1,1768,500**	**1,1768,500**	**1,1768,500**	**1,1768,500**	**1,1768,500**	**1,1768,500**	**1,1768,500**	**1,1768,500**

Entire UCRB Management Region BLM/FS Management Class	Current Year[2]	1	2	3	4	5	6	7
		Alternative/Simulation year 10						
None (hectares)	6,093,500	5,855,900	6,093,500	6,093,500	6,093,500	6,040,700	6,093,500	6,093,500
Percent Change from Current	NA	-4	0	0	0	-1	0	0
Percent of Region /Class Total	35.9	34.5	35.9	35.9	35.9	35.6	35.9	35.9
Very Low / Low (hectares)	3,834,800	3,980,300	3,834,800	3,834,800	3,384,800	3,838,000	3,834,800	3,834,800
Percent Change from Current	NA	4	0	0	0	0	0	0
Percent of Region /Class Total	22.6	23.4	22.6	22.6	22.6	22.6	22.6	22.6
Moderate (hectares)	3,455,100	3,547,200	3,455,100	3,529,200	3,529,200	3,504,700	3,877,300	3,951400
Percent Change from Current	NA	3	0	2	2	1	12	14
Percent of Region /Class Total	20.3	20.9	20.3	20.8	20.8	20.6	22.8	23.3
High / Extremely High (hectares)	3,595,300	3,595,300	3,595,300	3,521,200	3,521,200	3,595,300	3,173,100	3,099,000
Percent Change from Current	NA	0	0	-2	-2	0	-12	-14
Percent of Region /Class Total	21.2	21.2	21.2	20.7	20.7	21.2	18.7	18.3
BLM/FS UCRB Total (hectares)	**1,6978,700**	**1,6978,700**	**1,6978,700**	**1,6978,700**	**1,6978,700**	**1,6978,700**	**1,6978,700**	**1,6978,700**
Grand Total of EEIS & UCRB BLM/FS Lands (hectares)	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**

Table 6B.3 (continued)

Blue Mountains Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class	Current Year	1	2	3	4	5	6	7
		Alternative/Simulation year 10						
None (hectares)	652,500	637,700	652,500	652,500	652,500	652,500	652,500	652,500
Percent Change from Current	NA	-2	0	0	0	0	0	0
Percent of Region /Class Total	25.8	25.2	25.8	25.8	25.8	25.8	25.8	25.8
Very Low / Low (hectares)	234,600	230,300	234,600	234,600	234,600	234,600	234,600	234,600
Percent Change from Current	NA	-2	0	0	0	0	0	0
Percent of Region /Class Total	9.3	9.1	9.3	9.3	9.3	9.3	9.3	9.3
Moderate (hectares)	453,300	472,400	453,300	1279,600	1289,400	453,300	463,400	1,289,700
Percent Change from Current	NA	4	0	182	184	0	2	185
Percent of Region /Class Total	17.9	18.7	17.9	50.6	51	17.9	18.3	51
High / Extremely High (hectares)	1,189,400	1,189,400	1,189,400	363,100	353,300	1189,400	1179,300	353,000
Percent Change from Current	NA	0	0	-69	-70	0	-1	-70
Percent of Region /Class Total	47	47	47	14.4	14	47	46.6	14
Blue Mountains EEIS BLM/FS Total (hectares)	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**

UCRB Management Region

BLM/FS Management Class	Current Year	1	2	3	4	5	6	7
		Alternative/Simulation year 10						
None (hectares)	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8
Very Low / Low (hectares)	34,700	34,700	34,700	34,700	34,700	34,700	34,700	34,700
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1
Moderate (hectares)	28,100	28,100	28,100	28,100	28,100	28,100	28,100	28,100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	26	26	26	26	26	26	26	26
High / Extremely High (hectares)	29,300	29,300	29,300	29,300	29,300	29,300	29,300	29,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Blue Mountains UCRB BLM/FS Total (hectares)	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**
Blue Mountains UCRB EEIS FS/BLM Total (hectares)	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**

Table 6B.3 (continued)

Central Idaho Mountains Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	8,300	8,300	8,300	8,300	8,300	8,300	8,300	8,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	92.2	92.2	92.2	92.2	92.2	92.2	92.2	92.2
Very Low / Low (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Moderate (hectares)	0	0	0	0	0	0	,600	600
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	.6.7	6.7
High / Extremely High (hectares)	600	600	600	600	600	600	0	0
Percent Change from Current	NA	0	0	0	0	0	-100	-100
Percent of Region /Class Total	6.7	6.7	6.7	6.7	6.7	6.7	0	0
Central Idaho Mountains EEIS BLM/FS Total (hectares)	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	3,606,600	3,562,600	3,606,600	3,606,600	3,606,600	3,606,600	3,606,600	3,606,600
Percent Change from Current	NA	-1	0	0	0	0	0	0
Percent of Region /Class Total	55.8	55.1	55.8	55.8	55.8	55.8	55.8	55.8
Very Low / Low (hectares)	968,800	1003,300	968,800	968,800	968,800	968,800	968,800	968,800
Percent Change from Current	NA	4	0	0	0	0	0	0
Percent of Region /Class Total	15	15.5	15	15	15	15	15	15
Moderate (hectares)	914,500	924,000	914,500	943,200	943,200	914,500	1,138,000	1,166,700
Percent Change from Current	NA	1	0	3	3	0	24	28
Percent of Region /Class Total	14.2	14.3	14.2	14.6	14.6	14.2	17.6	18.1
High / Extremely High (hectares)	972,400	972,400	972,400	943,700	943,700	972,400	748,900	720,200
Percent Change from Current	NA	0	0	-3	-3	0	-23	-26
Percent of Region /Class Total	15	15	15	14.6	14.6	15	11.6	11.1
Central Idaho Mountains UCRB BLM/FS Total (hectares)	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6462300**
Central Idaho Mountains UCRB & EEIS FS/BLM Total (hectares)	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471300**

Table 6B.3 (continued)

Columbia Plateau Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	113,200	112,000	113,200	113,200	113,200	113,200	113,200	113,200
Percent Change from Current	NA	-1	0	0	0	0	0	0
Percent of Region /Class Total	10.8	10.7	10.8	10.8	10.8	10.8	10.8	10.8
Very Low / Low (hectares)	87,900	83,200	87,900	87,900	87,900	87,900	87,900	87,900
Percent Change from Current	NA	-5	0	0	0	0	0	0
Percent of Region /Class Total	8.4	8	8.4	8.4	8.4	8.4	8.4	8.4
Moderate (hectares)	265,200	271,100	265,200	351,000	634,100	265,200	266,200	352,000
Percent Change from Current	NA	2	0	32	139	0	0	33
Percent of Region /Class Total	25.4	25.9	25.4	33.6	60.6	25.4	25.5	33.7
High / Extremely High (hectares)	579,300	579,300	579,300	493,500	210,400	579,300	578,300	492,500
Percent Change from Current	NA	0	0	-15	-64	0	0	-15
Percent of Region /Class Total	55.4	55.4	55.4	47.2	20.1	55.4	55.3	47.1
Columbia Plateau EEIS BLM/FS Total (hectares)	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	1,400	1,300	1,400	1,400	1,400	1,400	1,400	1,400
Percent Change from Current	NA	-7	0	0	0	0	0	0
Percent of Region /Class Total	1.7	1.5	1.7	1.7	1.7	1.7	1.7	1.7
Very Low / Low (hectares)	3,100	3,200	3,100	3,100	3,100	3,100	3,100	3,100
Percent Change from Current	NA	3	0	0	0	0	0	0
Percent of Region /Class Total	3.7	3.8	3.7	3.7	3.7	3.7	3.7	3.7
Moderate (hectares)	4,400	4,400	4,400	4,400	4,400	4,400	54,900	54,900
Percent Change from Current	NA	0	0	0	0	0	1148	1,148
Percent of Region /Class Total	5.2	5.2	5.2	5.2	5.2	5.2	65.3	6,5.3
High / Extremely High (hectares)	75,200	75,200	75,200	75,200	75,200	75,200	24,700	24,700
Percent Change from Current	NA	0	0	0	0	0	-67	-67
Percent of Region /Class Total	89.4	89.4	89.4	89.4	89.4	89.4	29.4	29.4
Columbia Plateau UCRB BLM/FS Total (hectares)	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**
Columbia Plateau UCRB & EEIS FS/BLM Total (hectares)	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**

Table 6B.3 (continued)

Lower Clark Fork Ecological Reporting Unit EEIS Management Region BLM/FS Management Class		Alternative/Simulation year 10						
	Current Year	1	2	3	4	5	6	7
None (hectares)	221,200	192,100	221,200	221,200	221,200	192,100	221,200	221,200
Percent Change from Current	NA	-13	0	0	0	-13	0	0
Percent of Region /Class Total	12.7	11	12.7	12.7	12.7	11	12.7	12.7
Very Low / Low (hectares)	122,900	127,700	122,900	122,900	122,900	127,700	122,900	122,900
Percent Change from Current	NA	4	0	0	0	4	0	0
Percent of Region /Class Total	7.1	7.3	7.1	7.1	7.1	7.3	7.1	7.1
Moderate (hectares)	374,200	398,500	374,200	374,200	374,200	398,500	374,200	374,200
Percent Change from Current	NA	6	0	0	0	6	0	0
Percent of Region /Class Total	21.5	22.9	21.5	21.5	21.5	22.9	21.5	21.5
High / Extremely High (hectares)	1,023,300	1,023,300	1,023,300	1,023,300	1,023,300	1,023,300	1,023,300	1,023,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8
Lower Clark Fork UCRB BLM/FS Total (hectares)	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1741,600**
Lower Clark Fork UCRB & EEIS FS/BLM Total (hectares)	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1,741600**

Northern Cascades Ecological Reporting Unit EEIS Management Region BLM/FS Management Class		Alternative/Simulation year 10						
	Current Year	1	2	3	4	5	6	7
None (hectares)	653,900	641,700	653,900	653,900	653,900	648,200	653,900	653,900
Percent Change from Current	NA	-2	0	0	0	-1	0	0
Percent of Region /Class Total	47	46.1	47	47	47	46.6	47	47
Very Low / Low (hectares)	138,800	138,900	138,800	138,800	138,800	139,200	138,800	138,800
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	10	10	10	10	10	10	10	10
Moderate (hectares)	225,300	237,400	225,300	225,300	225,300	230,600	251,300	251,300
Percent Change from Current	NA	5	0	0	0	2	12	12
Percent of Region /Class Total	16.2	17.1	16.2	16.2	16.2	16.6	18.1	18.1
High / Extremely High (hectares)	373,200	373,200	373,200	373,200	373,200	373,200	347,200	347,200
Percent Change from Current	NA	0	0	0	0	0	-7	-7
Percent of Region /Class Total	26.8	26.8	26.8	26.8	26.8	26.8	25	25
Northern Cascades EEIS BLM/FS Total (hectares)	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391200**
Northern Cascades UCRB & EEIS FS/BLM Total (hectares)	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391200**

Table 6B.3 (continued)

Northern Glaciated Mountains Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class	Current Year	Alternative/Simulation year 10: 1	2	3	4	5	6	7
None (hectares)	72,600	70,300	72,600	72,600	72,600	70,300	72,600	72,600
Percent Change from Current	NA	-3	0	0	0	-3	0	0
Percent of Region /Class Total	12.2	11.8	12.2	12.2	12.2	11.8	12.2	12.2
Very Low / Low (hectares)	17,800	18,000	17,800	17,800	17,800	18,000	17,800	17,800
Percent Change from Current	NA	1	0	0	0	1	0	0
Percent of Region /Class Total	3	3	3	3	3	3	3	3
Moderate (hectares)	84,400	86,500	84,400	84,400	84,400	86,500	84,400	84,400
Percent Change from Current	NA	2	0	0	0	2	0	0
Percent of Region /Class Total	14.2	14.6	14.2	14.2	14.2	14.6	14.2	14.2
High / Extremely High (hectares)	419,100	419,100	419,100	419,100	419,100	419,100	419,100	419,100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	70.6	70.6	70.6	70.6	70.6	70.6	70.6	70.6
Northern Glaciated Mountains EEIS BLM/FS Total (hectares)	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593900**

UCRB Management Region

BLM/FS Management Class	Current Year	Alternative/Simulation year 10: 1	2	3	4	5	6	7
None (hectares)	599,200	561,900	599,200	599,200	599,200	575,500	599,200	599,200
Percent Change from Current	NA	-6	0	0	0	-4	0	0
Percent of Region /Class Total	28.5	26.7	28.5	28.5	28.5	27.4	28.5	28.5
Very Low / Low (hectares)	246,800	255,700	246,800	246,800	246,800	245,200	246,800	246,800
Percent Change from Current	NA	4	0	0	0	-1	0	0
Percent of Region /Class Total	11.7	12.2	11.7	11.7	11.7	11.7	11.7	11.7
Moderate (hectares)	294,400	322,800	294,400	294,400	294,400	319,700	326,800	326,800
Percent Change from Current	NA	10	0	0	0	9	11	11
Percent of Region /Class Total	14	15.4	14	14	14	15.2	15.5	15.5
High / Extremely High (hectares)	961,300	961,300	961,300	961,300	961,300	961,300	928,900	928,900
Percent Change from Current	NA	0	0	0	0	0	-3	-3
Percent of Region /Class Total	45.7	45.7	45.7	45.7	45.7	45.7	44.2	44.2
Northern Glaciated Mountains UCRB BLM/FS Total (hectares)	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**
Northern Glaciated Mountains UCRB & EEIS FS/BLM Total (hectares)	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**

Table 6B.3 (continued)

Northern Great Basin Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	727,000	725,600	727,000	727,000	727,000	727,000	727,000	727,000
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7
Very Low / Low (hectares)	757,900	751,900	757,900	757,900	757,900	757,900	757,900	757,900
Percent Change from Current	NA	-1	0	0	0	0	0	0
Percent of Region /Class Total	24.7	24.5	24.7	24.7	24.7	24.7	24.7	24.7
Moderate (hectares)	1,237,000	1,244,400	1,237,000	1,365,300	1,365,300	1,1237,000	1,237,000	1,365,300
Percent Change from Current	NA	1	0	10	10	0	0	10
Percent of Region /Class Total	40.4	40.6	40.4	44.6	44.6	40.4	40.4	44.6
High / Extremely High (hectares)	342,700	342,700	342,700	214,400	214,400	342,700	342,700	214,400
Percent Change from Current	NA	0	0	-37	-37	0	0	-37
Percent of Region /Class Total	11.2	11.2	11.2	7	7	11.2	11.2	7
Northern Great Basin EEIS BLM/FS Total (hectares)	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**
Northern Great Basin UCRB & EEIS FS/BLM Total (hectares)	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**

Owyhee Uplands Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	434,500	434,500	434,500	434,500	434,500	434,500	434,500	434,500
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Very Low / Low (hectares)	302,300	302,300	302,300	302,300	302,300	302,300	302,300	302,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8
Moderate (hectares)	846,400	846,400	846,400	846,400	846,400	846,400	846,400	846,400
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	52.7	52.7	52.7	52.7	52.7	52.7	52.7	52.7
High / Extremely High (hectares)	22,200	22,200	22,200	18,900	18,900	22,200	22,200	18,,900
Percent Change from Current	NA	0	0	-15	-15	0	0	-15
Percent of Region /Class Total	1.4	1.4	1.4	1.2	1.2	1.4	1.4	1.2
Owyhee Uplands EEIS BLM/FS Total (hectares)	**1605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**

Table 6B.3 (continued)

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	677,800	677,800	677,800	677,800	677,800	677,800	677,800	677,800
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9
Very Low / Low (hectares)	1,697,500	1,697,500	1,697,500	1,697,500	1,697,500	1,697,500	1,697,500	1,697,500
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	47.3	47.3	47.3	47.3	47.3	47.3	47.3	47.3
Moderate (hectares)	1,074,600	1,074,600	1,074,600	1,074,600	1,074,600	1,074,600	1,074,600	1,074600
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9
High / Extremely High (hectares)	139,800	139,800	139,800	139,800	139,800	139,800	139,800	139,800
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Owyhee Uplands UCRB BLM/FS Total (hectares)	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**
Owyhee Uplands UCRB & EEIS FS/BLM Total (hectares)	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195100**

Snake Headwaters Ecological Reporting Unit

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	99,400	97,600	99,400	99,400	99,400	99,400	99,400	99,400
Percent Change from Current	NA	-2	0	0	0	0	0	0
Percent of Region /Class Total	33.1	32.5	33.1	33.1	33.1	33.1	33.1	33.1
Very Low / Low (hectares)	72,600	74,200	72,600	72,600	72,600	72,600	72,600	72,600
Percent Change from Current	NA	2	0	0	0	0	0	0
Percent of Region /Class Total	24.2	24.7	24.2	24.2	24.2	24.2	24.2	24.2
Moderate (hectares)	75,000	75,200	75,000	76,900	76,900	75,000	75,000	76,900
Percent Change from Current	NA	0	0	3	3	0	0	3
Percent of Region /Class Total	25	25.1	25	25.6	25.6	25	25	25.6
High / Extremely High (hectares)	53,100	53,100	53,100	51,200	51,200	53,100	53,100	51,200
Percent Change from Current	NA	0	0	-4	-4	0	0	-4
Percent of Region /Class Total	17.7	17.7	17.7	17.1	17.1	17.7	17.7	17.1
Snake Headwaters UCRB BLM/FS Total (hectares)	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**
Snake Headwaters UCRB & EEIS FS/BLM Total (hectares)	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**

Table 6B.3 (continued)

Southern Cascades Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	152,600	145,700	152,600	152,600	152,600	149,600	152,600	152,600
Percent Change from Current	NA	-5	0	0	0	-2	0	0
Percent of Region /Class Total	19.2	18.3	19.2	19.2	19.2	18.8	19.2	19.2
Very Low / Low (hectares)	67,000	35,400	67,000	67,000	67,000	39,900	67,000	67,000
Percent Change from Current	NA	-47	0	0	0	-40	0	0
Percent of Region /Class Total	8.4	4.4	8.4	8.4	8.4	5	8.4	8.4
Moderate (hectares)	54,000	92,500	54,000	195,400	195,400	84,100	132,000	273,400
Percent Change from Current	NA	71	0	262	262	56	144	406
Percent of Region /Class Total	6.8	11.6	6.8	24.6	24.6	10.6	16.6	34.4
High / Extremely High (hectares)	522,200	522,200	522,200	380,800	380,800	522,200	444,200	302,800
Percent Change from Current	NA	0	0	-27	-27	0	-15	-42
Percent of Region /Class Total	65.6	65.6	65.6	47.9	47.9	65.6	55.8	38
Southern Cascades EEIS BLM/FS Total (hectares)	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**
Southern Cascades UCRB & EEIS FS/BLM Total (hectares)	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**

Upper Clark Fork Ecological Reporting Unit UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	523,600	398,300	523,600	523,600	523,600	523,600	523,600	523,600
Percent Change from Current	NA	-24	0	0	0	0	0	0
Percent of Region / Class Total	42.5	32.3	42.5	42.5	42.5	42.5	42.5	42.5
Very Low / Low (hectares)	190,400	286,000	190,400	190,400	190,400	190,400	190,400	190,400
Percent Change from Current	NA	50	0	0	0	0	0	0
Percent of Region /Class Total	15.5	23.2	15.5	15.5	15.5	15.5	15.5	15.5
Moderate (hectares)	266,600	296,300	266,600	310,100	310,100	266,600	382,300	425,800
Percent Change from Current	NA	11	0	16	16	0	43	60
Percent of Region /Class Total	21.6	24.1	21.6	25.2	25.2	21.6	31	34.6
High / Extremely High (hectares)	251,100	251,100	251,100	207,600	207,600	251,100	135,400	91,900
Percent Change from Current	NA	0	0	-17	-17	0	-46	-63
Percent of Region /Class Total	20.4	20.4	20.4	16.9	16.9	20.4	11	7.5
Upper Clark Fork UCRB BLM/FS Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**
Upper Clark Fork UCRB & EEIS FS/BLM Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**

Table 6B.3 (continued)

Upper Klamath Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	93,300	90,100	93,300	93,300	93,300	93,300	93,300	93,300
Percent Change from Current	NA	-3	0	0	0	0	0	0
Percent of Region /Class Total	12.7	12.3	12.7	12.7	12.7	12.7	12.7	12.7
Very Low / Low (hectares)	47,500	26,000	47,500	47,500	47,500	47,500	47,500	47,500
Percent Change from Current	NA	-45	0	0	0	0	0	0
Percent of Region /Class Total	6.5	3.5	6.5	6.5	6.5	6.5	6.5	6.5
Moderate (hectares)	72,200	96,900	72,200	472,100	497,300	72,200	86,500	486,400
Percent Change from Current	NA	34	0	554	589	0	20	574
Percent of Region /Class Total	9.8	13.2	9.8	64.4	67.8	9.8	11.8	66.3
High / Extremely High (hectares)	520,200	520,200	520,200	120,300	95,100	520,200	505,900	106,000
Percent Change from Current	NA	0	0	-77	-82	0	-3	-80
Percent of Region /Class Total	70.9	70.9	70.9	16.4	13	70.9	69	14.5
Upper Klamath EEIS BLM/FS Total (hectares)	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**
Upper Klamath UCRB & EEIS FS/BLM Total (hectares)	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**

Upper Snake Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	348,300	348,300	348,300	348,300	348,300	348,300	348,300	348,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6
Very Low / Low (hectares)	498,000	498,000	498,000	498,000	498,000	498,000	498,000	498,000
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6
Moderate (hectares)	423,300	423,300	423,300	423,300	423,300	423,300	423,300	423,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1
High / Extremely High (hectares)	89,800	89,800	89,800	89,800	89,800	89,800	89,800	89,800
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6

Table 6B.3 (continued)

Upper Snake Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Upper Snake UCRB BLM/FS Total (hectares)	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**
Upper Snake UCRB & EEIS FS/BLM Total (hectares)	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**
Grand Total of UCRB & EEIS BLM/FS Lands (hectares)	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**

[1]Planning Areas: EEIS BLM/FS–Eastern Oregon and Washington, BLM and FS-administered lands only; UCRB BLM/FS–Upper Columbia River Basin, BLM and FS-administered lands only.

[2]The "current year" data portrayed in this table is from an early version of the alternatives (preliminary draft Environmental Impact Statements, fall 1995). Due to changes in the tables (classification of cover types to cover type codes) used for the latest CRBSUM model vegetation predictions, the current year baseline was changed when the model was initialized. However, this new modeled current year will not be reported since this would change the baseline and many other analyses that have already been completed. The project time line did not allow sufficient time to redo all previous work. The overall impact of using the old current baseline is that differences between alternatives and current hectares may appear to be larger than they should be.

[3]hectare=2.47 acres

[4]NA=Not Applicable

CHAPTER 7

Ecological Integrity, Socioeconomic Resiliency, and Trends in Risk

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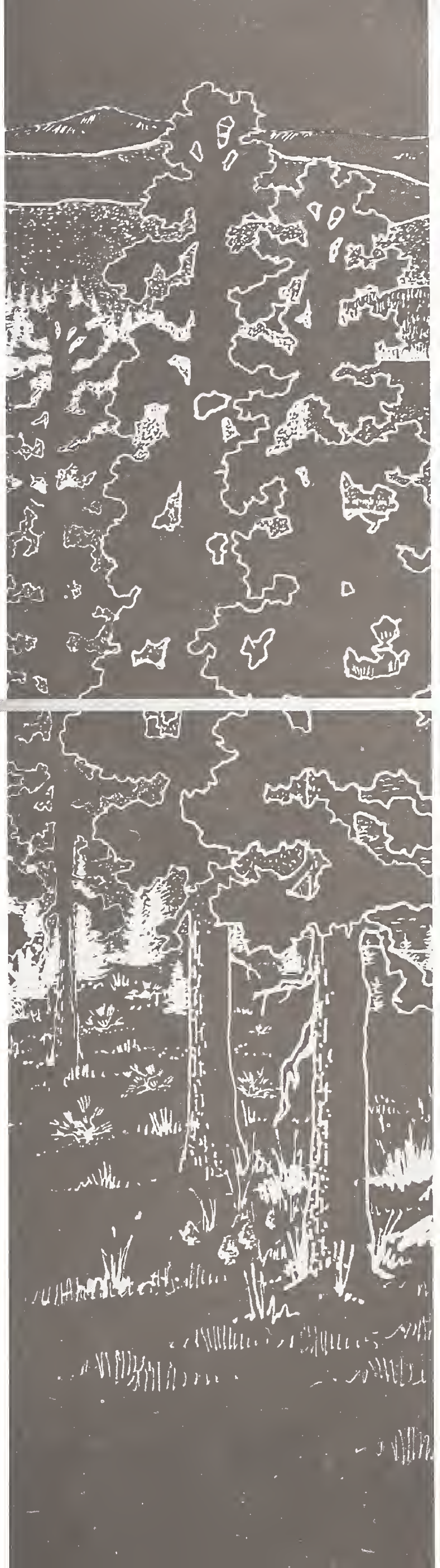

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The Draft Environmental Impact Statements describe two primary needs underlying the proposed action: (1) restore and maintain long-term ecosystem health and integrity; and (2) support the economic and/or social needs of people, cultures, and communities, and provide sustainable and predictable levels of products and services. The needs are linked with specific goals selected by the EIS teams. The goals they identified include: 1) maintain, and where necessary restore, the long-term health and integrity of forest, rangeland, aquatic, and riparian ecosystems; 2) provide sustainable and predictable levels of products and services within the capability of the ecosystem; 3) provide opportunities for diverse cultural, recreational, and aesthetic experiences within the capability of the ecosystem; 4) contribute to the recovery and delisting of threatened and endangered species; and, 5) manage natural resources consistent with treaty and trust responsibilities to American Indian tribes (Preliminary Draft EISs 1996[1]). These needs and goals imply the desire to achieve and maintain ecological integrity at a high level. These needs and goals were examined by addressing ecological integrity, socioeconomic resiliency, and the risks associated with human ecological interactions.

A composite estimate of current ecological integrity was developed across the entire Basin for all FS- and BLM-administered land and the trend in ecological integrity was estimated for each alternative over the next 100 years. This required identification of the current condition of specific ecological integrity components (aquatic/riparian, forest, rangeland, and hydrologic) (Quigley and others 1996). Current socioeconomic resiliency was estimated for social and economic systems, and its variation across the Basin was described (Quigley and others 1996). The trends in risk associated with human ecological interaction represents the change expected to result from people interacting with the wildland system, and the change expected as disturbances within the wildland system come in conflict with human assets. These trends are projected for each alternative. They provide useful estimates to show how FS and BLM management as proposed in the alternatives might influence ecological integrity and socioeconomic resiliency. These estimates are not intended to be measures of final outcomes, but are an indication of the direction of movement brought on by the implementation of each EIS alternative. Each alternative was evaluated to project how the actions of the FS and BLM would contribute to integrity, socioeconomic resiliency, and human ecological interactions.

Ecological Integrity

It is recognized that there are no direct measures of ecological integrity and that assessing integrity requires comparisons against a set of ecological conditions and against a set of clearly stated management goals and objectives (Woodley, Kay, and Francis 1993). This process is not strictly a scientific endeavor (Wickium and Davies 1995), because to provide meaning, ecological integrity must be grounded to desired outcomes. The overriding ecological outcome expected, as articulated in the EIS Alternatives for FS- and BLM-administered lands within the Basin, is to maintain or enhance ecosystem or ecological integrity.

High levels of ecological integrity are dependent on: the maintenance of evolutionary and ecological processes, such as types and frequencies of disturbances, water cycling, energy flow, and nutrient cycling; ecosystem functions and processes that operate on multiple ecological domains and evolutionary time frames; and, viable populations of native and desired non-native species (see Haynes and others 1996 for a broader discussion). These processes and functions have transitioned from historic ranges of conditions to their present status. The basic components of ecological integrity

[1]On file with: U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar Street, Walla Walla, Washington 99362.

include the forest, range, and aquatic systems with a hydrologic system interconnecting the landscape into a whole. High integrity for these components can be defined:

> A forest and range (terrestrial environment) system that exhibits high integrity is defined here as a mosaic of plant and animal communities, consisting of well connected, high-quality habitats on FS- and BLM-administered lands that support a diverse assemblage of native and desired non-native species, the appropriate expression of potential life histories and taxonomic lineages, and the taxonomic and genetic diversity necessary for long-term persistence and adaptation in a variable environment.
>
> An aquatic system that exhibits high integrity is defined here as a mosaic of well connected, high-quality water and habitats that support a diverse assemblage of native and desired non-native species, the full expression of appropriate potential life histories and dispersal mechanisms, and the genetic diversity necessary for long-term persistence and adaptation in a variable environment.
>
> Landscapes jointly encompass the terrestrial and aquatic environments. A hydrologic network operates within basins on the landscape. A hydrologic system that exhibits high integrity is defined here as a network of streams, along with their unique ground water ecosystems, within the broader landscape where the upland, floodplain, and riparian areas have resilient vegetation, where the capture, storage, and release of water limits the effects of sedimentation and erosion, and where infiltration, percolation, and nutrient cycling provide for diverse and productive aquatic and terrestrial environments.

These estimates of integrity and resiliency are presented as initial estimates based on our understanding of the information available. Absolute levels of integrity or resiliency within the Basin are not presumed to have been measured nor revealed. Rather, these represent the first attempt at estimating relative integrity at this spatial level and undoubtedly will be refined as additional information becomes available. Given more time and information, integrity indices might have included direct consideration for elements such as recovery cycles, synergistic interactions between environmental components and biophysical linkages, and feedback mechanisms operating on different spatial and temporal scales within the area.

Composite Ecological Integrity

Subbasins (approximately 325,000 to 400,000 hectares in size) were rated as having high, medium, or low ecological integrity for: forest lands, rangelands, forest and rangeland hydrologic systems, and aquatic systems (Sedell and others 1996). Each of the 164 subbasins within the Basin was rated, and ratings considered all ownerships within the Basin. The actual ratings combined analysis based on descriptive data layers, empirical process models, trend analysis, and expert judgment. The basic data sets on which the ratings were based are aggregations of data from broad-scale map themes, subwatershed information, or model projections (Quigley and others 1996).

These basic layers provided the backdrop for estimating current composite ecological integrity for FS- and BLM-administered lands within each subbasin. The component integrity layers were used with the information brought forward through the assessment (Quigley and Arbelbide, in press), the evaluation of alternatives which included a discussion of landscape integrity, terrestrial integrity (Marcot 1996), and our understanding of conditions and trends, to estimate the current composite ecological integrity for each subbasin (map 7.1). Composite integrity was estimated by comparing the component integrity ratings and knowledge of actual on-the-ground conditions with how each subbasin met the definitions described previously for systems with high ecological integrity.

The composite ecological integrity ratings are relative measures within the Basin. High composite ecological integrity indicates that, relative to the other subbasins within the assessment area, a subbasin meets the definitions of high integrity more

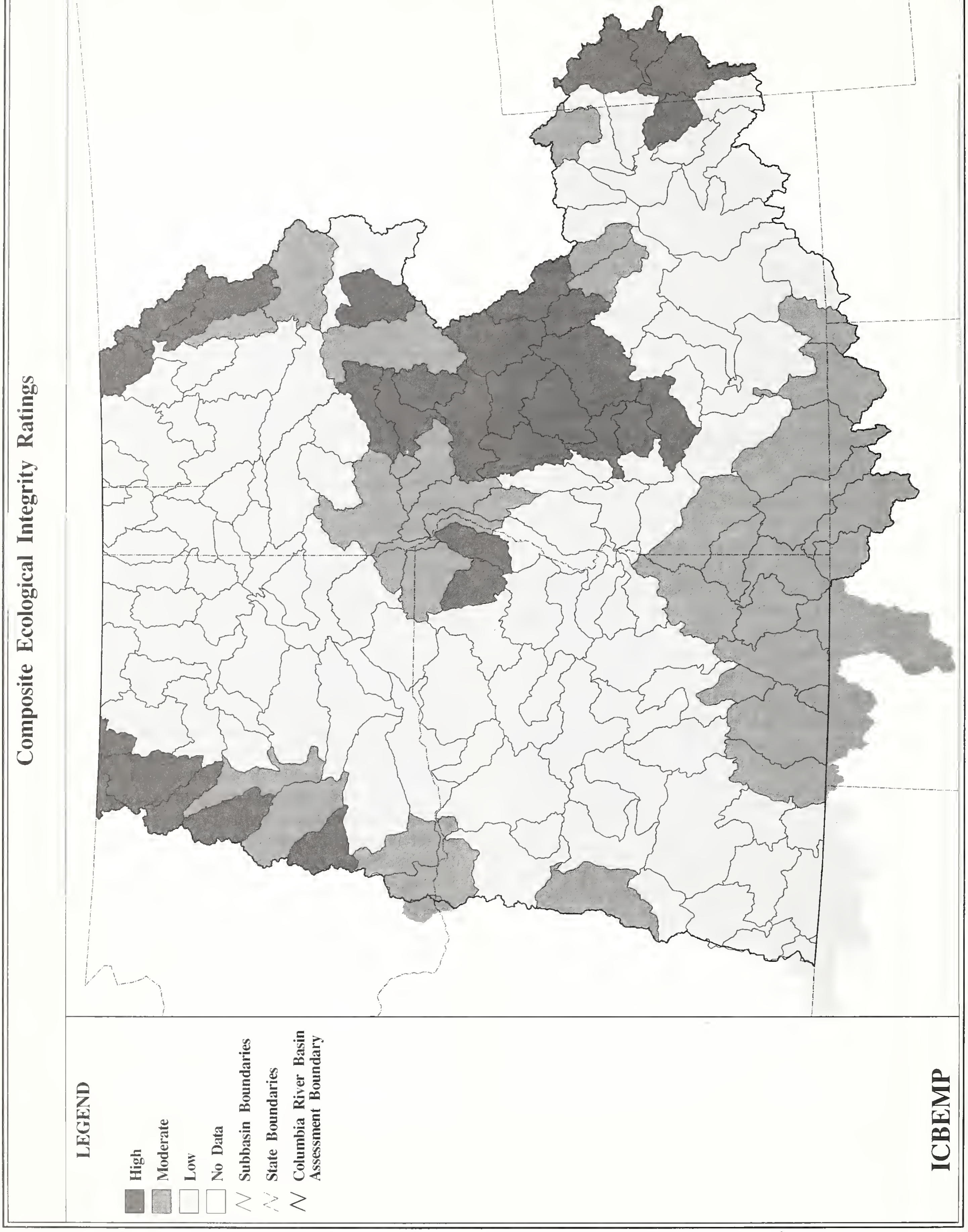
than those subbasins rated as medium or low. At present 26 percent of the FS- and BLM-administered lands within the Basin are rated as high integrity, 29 percent are rated as medium, and 45 percent are in low ecological integrity (fig. 7.1a and 7.1b). Of the total area within the Basin that is rated as having high composite ecological integrity, 84 percent is on lands administered by the FS and BLM. A rating of low does not necessarily translate to "bad" or "poor". For instance, many of the subbasins rated as having low ecological integrity include large areas of farmland. These areas are important and may be functioning just as society would have them function.

Trends in Composite Ecological Integrity

Trends in ecological integrity for FS- and BLM-administered lands are dependent on current integrity, future management actions (such as timber harvest, prescribed fire, grazing, and restoration), and unplanned disturbance events (such as fire, flood, insects, disease, and climate variation). Basic rule sets were developed to predict trends in integrity for FS- and BLM-administered lands. No attempt was made to project the component integrity elements directly. The projections available through the evaluation of alternatives were examined to determine which ones might provide the most universal predictors of change in integrity. Three primary indicators were chosen to use; each is equally weighted in its contribution to composite ecological integrity trends: forest and rangeland vegetation (as integrated indicators of such elements as disturbance, succession, management activities, exotics, and habitat); riparian management (as indicators of such elements as aquatic environment, riparian communities, connectivity of riparian and aquatic ecosystems across the FS and BLM landscapes, fragmentation, and habitats); and, road density changes (as indicators of such elements as change in erosion, sediment, terrestrial habitat fragmentation, and exotic introductions). A broad array of elements contribute to integrity trends and are represented by these three proxies (table 7.1).

Methods — To identify expected trends in composite ecological integrity under each of the alternatives, a set of indices was generated based on expected changes in vegetation structure and composition, changes in road densities, and riparian management for each alternative. An intermediate score for vegetation was generated based on potential vegetation type (forest or range) and the prescription models (see the Landscape Ecology section of this report for detail concerning prescriptions) applied within each alternative (table 7.2). Intermediate scores were generated for each 1-square-kilometer pixel within the Basin using the rule set in table 7.2, and the potential vegetation maps and prescription allocations developed by the landscape staff. Mean scores were calculated for each subbasin based on an aggregation of FS- or BLM- administered land only. The mean intermediate scores were used in combination with the current rating of composite integrity to derive an index of expected change (table 7.3). This index (*vegidx*) assumed values of -1, 0, or +1, where the sign of the index refers to expected direction of change in ecological integrity (that is, -1 indicates that ecological integrity as reflected in vegetation is expected to decline; +1 suggests improvement, and 0 suggests no change). No attempt was made to quantify the magnitude of the expected change.

A similar index (*rdidx*) was constructed based on the projections of future road densities (resulting from the application of rule sets associating intensity of future management activity and current road densities) and our interpretation of the potential ecological ramifications of changing road densities. Two measures for each subbasin were calculated. One was the combined change in the proportion of FS- and BLM-administered lands within each subbasin with less than 0.1 miles of road per square mile (as projected by the spatial analysis team). This was referred to as the change in low road density. The second measure, change in high road density, measured an equivalent change in the FS- and BLM-administered area with greater than 1.7 road miles per square mile. These measures of change in road density were used along with the current composite integrity rating to assign *rdidx* values (table 7.4).



Map 7.1 – Composite ecological integrity ratings synthesized the forest, rangeland, forest and rangeland hydrologic, and aquatic component integrity ratings.

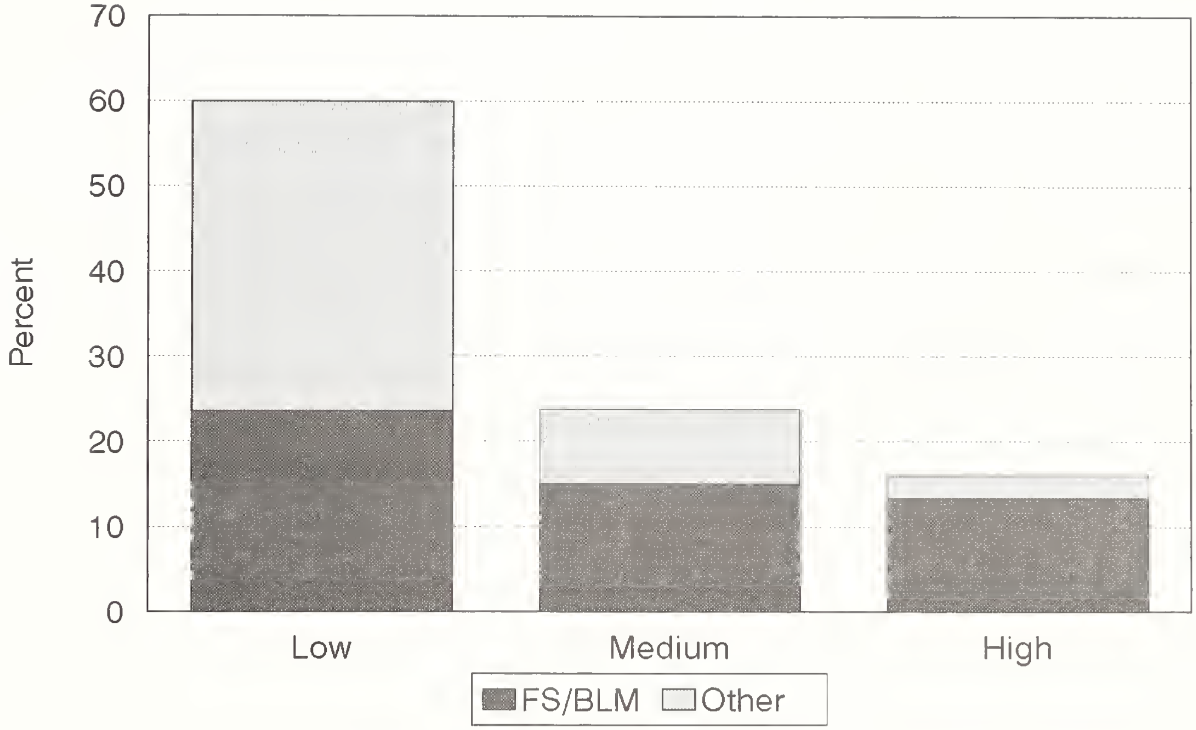


Figure 7.1a – Percent of the Basin by composite ecological integrity.

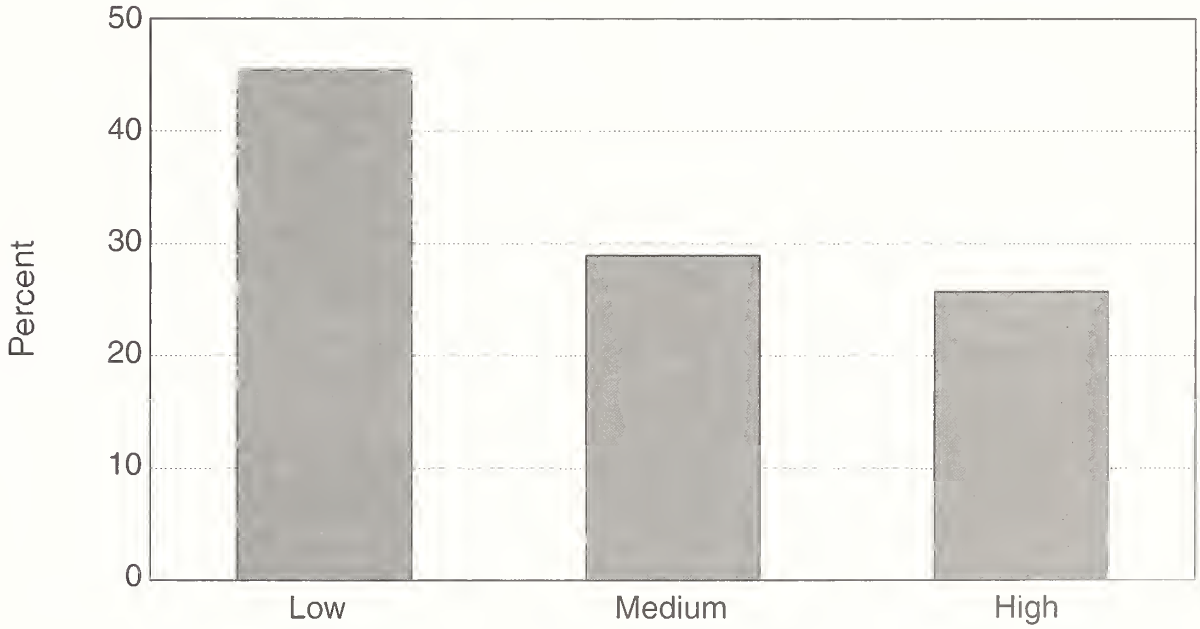


Figure 7.1b – Percent of FS- and BLM-administered land by composite ecological integrity.

Table 7.1– Proxies or indicators used to estimate trends in ecological integrity for the EIS alternatives.

Proxy	Represents
Forest and Range Vegetation	• Trends in susceptibility to severe and frequent fires • Trends in susceptibility to insect and disease outbreaks • Trends in stand structure and composition • Changes resulting from management activities - traditional commodity or conservation emphasis - ecological emphasis - thinning from below, grazing systems, prescribed fire, riparian management • Trends in containment and eradication of exotics
Riparian Management	•Trends in aquatic ecological function • Trends in water quality • Trends in riparian vegetation - Forested mature or late seral stage - Rangeland cover and density • Trends in habitat connectivity for riparian and aquatic ecosystems across the landscape • Trends in diverse habitats for riparian communities
Road density change	• Terrestrial habitat trajectories • Trends in hydrologic function • Trends in sedimentation and erosion • Trends in the introduction and spread of exotics • Trends in the risks for fire occurrence • Trends in habitat fragmentation

Table 7.2 – Intermediate scores used in the calculation of directional changes in integrity for each combination of prescription model and major vegetation group (forest or rangeland). Scores range from -5 (traditional production emphasis), to 0 (conserve existing structure and composition), to +5 (maximum restoration consistent with biophysical template).

Prescription Model	Forest score	Rangeland score
A1	+5	+1
A2	+4	+5
A3	+2	+3
C1	0	0
C2	-3	-3
C3	-4	-4
P1	-2	-2
P2	-3	-1
P3	-5	-5
N1	+1	+3
N2	-3	-2
N3	-4	-3
N4	-1	0
N5	-2	-1
N6	-4	-3
N7	-3	-2
N8	-4	-3

Table 7.3 – Rule set for determining the expected directional change (vegidx) in ecological integrity, based on current composite integrity rating and mean intermediate vegetation score for each subbasin.

Potential Vegetation	Current Composite Integrity Rating	Mean Intermediate Score	*Vegidx*
Forest	Low	-5 to 3	-1
		3 to 5	0
	Medium	-5 to 1	-1
		1 to 3	0
		3 to 5	+1
	High	-5 to 0	-1
		0 to 1	0
		1 to 5	+1
Rangeland	Low	-5 to 4	-1
		4 to 5	0
	Medium	-5 to 1	-1
		1 to 3	0
		3 to 5	+1
	High	-5 to 0	-1
		0 to 1	0
		1 to 5	+1

Table 7.4 – Rule set for determining directional change in integrity (rdidx) due to changes in area of low road density or high road density within each subbasin, and current composite integrity rating.

Change in low road densities	Change in high road densities	Current Composite Integrity Rating	*Rdidx*
any decrease	all	all	-1
0 to 5% increase	any increase	all	-1
	0 to 10% decrease	all	0
	> 10% decrease	low	0
		medium or high	+1
> 5% increase	any increase	low or medium	0
		high	-1
	0 to 10% decrease	low or medium	+1
		high	0
	> 10% decrease	all	+1

The third index of expected change (*sgidx*), was based on the level of riparian protection that would be provided on FS- and BLM-administered lands under each alternative. A simple rule set assigned values to each subbasin based on the alternative and whether the subbasin fell within one of several categories (table 7.5). This assignment was consistent with the evaluation of alternatives brought forward by the aquatic and terrestrial teams (see the aquatic and terrestrial sections of this report for a detailed description).

For each alternative and subbasin, we calculated a final index of change based simply on the sum of *vegidx, rdidx*, and *sgidx*. This composite index of change assumed values ranging from -3 to +3, where +3 indicates a strong improving trend in ecological integrity, 0 indicates no change in ecological integrity, and -3 indicates a strong declining trend in ecological integrity. Values of -2 and -1 indicate declining trends in integrity, but not as strong as a value of -3. The same logic applies to upward trends in integrity associated with +2 and +1 values.

Results and Discussion — Each alternative results in a different projection in composite ecological integrity trends (maps 7.2 through 7.8) (see appendix 7A for a listing of all values by subbasin). Summing across all the FS- and BLM-administered lands within the basin shows that the alternatives provide varying trends in composite integrity (fig. 7.2). Alternatives 1 and 5 are dominated by declining trends (approximately 95% and 70% respectively), while Alternatives 2, 3, and 7 have 20 percent, 10 percent, and 5 percent area with declining trends respectively. Alternatives 6 and 4 show all areas as either stable or improving trends. Over 70 percent of the area in Alternatives 4 and 6 show improving trends, while Alternative 1 has less than 3 percent of the area in improving trends. Alternatives 5 and 2 have 20 percent of the area in improving trends.

In the discussions that follow, integrity trends are described in terms of the proxies used in this analysis. The proxies represent many elements and a more complete discussion would not focus on the proxies but the elements they represent. Refer to table 7.1 for a partial listing of the elements represented by the proxies.

The moist forest vegetation types of western Montana and northern Idaho show declining trends in Alternatives 1, 2, 3, and 5 with mostly stable trends in Alternatives 4 and 6. The declining trends generally reflect that favorable contributions to integrity trends from riparian strategies are offset by forest and rangeland vegetation trends and/or road density trends. Attaining stable trends in this area would result from favorable riparian strategies and intensive management of road networks (decreasing road densities). The

forest and rangeland vegetation management strategies applied within the alternatives were generally not effective in restoring composition and structure to that which would be consistent with the long-term disturbance processes and the capabilities of the biophysical environment. More extensive treatments, focused specifically on the mid-seral vegetation types and prioritized within the area, might result in favorable trends for the vegetation component of integrity. The specific interactions that would occur with changing vegetation treatments would need to be explored if such a proposal were to come forward. Where this area shows improving trends in ecological integrity in Alternative 7 is related to decreasing road densities and favorable riparian strategies as opposed to vegetation conditions consistent with long-term disturbance processes and the capabilities of the biophysical environment.

The dry forest vegetation types of eastern Oregon show declining trends in Alternatives 1 and 5, stable trends in 2, 3, and 4, and improving trends in 6 and portions of 7. The rationale for these trends is similar to those for the moist forest types. In the action alternatives the improving-trend contribution from riparian strategies is generally offset by declining trends from road density changes. The forest and rangeland vegetation trends under the prescriptions of the alternatives did not result in improving trends in integrity. The forest and rangeland vegetation management strategies applied within the alternatives generally were not effective in restoring composition and structure to that consistent with the long-term disturbance processes and the capabilities of the biophysical environment. More extensive treatments, focused specifically on the mid-seral vegetation types, and prioritized within the area might result in favorable trends for the vegetation component of integrity. Alternative 6 shows improving trends for this area that reflect favorable riparian strategies and more aggressive road density management than the other alternatives.

In the action alternatives (3 through 7) declining trends on rangelands generally reflect the degree noxious weeds are contained or reduced, and the vegetation structure and cover type changes that result from grazing, disturbances, changes in fire regime, and woody species encroachment. Where aggressive management of noxious weeds, grazing management, watershed restoration, and road density reductions are planned, the trends are stable or improving.

The large reserves of Alternative 7 have areas where the integrity trend is projected to be declining. This declining trend reflects the timeframe (100-year projection), current conditions, and projected approach to fire management and road closures. Fire suppression during the last several decades has been effective in removing fire from many of the existing wilderness areas of central Idaho, resulting in the buildup of fuels in much of this area. This buildup of fuels is not projected to burn within the next decade, but is likely to burn with large fires in the next 100 years. For those areas showing declining trends in the 100-year timeframe in the reserves, the trend in the next decade might be stable and in a 400 year timeframe might be favorable.

The rationale for the riparian strategy contribution to trends is related to the management approach to existing roads within the reserves. Alternative 7 calls for the roads to be closed, but not necessarily obliterated or put to bed. Most, but not all, of the significant potential contributors to adverse ecological conditions from these closed roads would be addressed. This would likely contribute to problems during the 100 year timeframe as culverts become plugged and washouts occur, and erosion on road surfaces increases. Favorable trends in integrity for riparian strategies were not projected within reserves. Similar concerns are projected for rangeland areas within reserves related to noxious weed expansion and the influence of wildfire in the absence of substantial restoration. Fire suppression was projected to occur according to national fire policy, but projected wildfire size was larger than could be effectively controlled.

Table 7.5 – Rule set for assigning expected change (sgidx) in composite integrity due to implementation of riparian standards and guidelines under each of the proposed alternatives.

Alternative	Conditions	Sgidx
1	Protected under FEMAT	+1
	Greater than 50% in wilderness	0
	Otherwise	-1
2, 3, 4, 6, 7	Protected under FEMAT, PACFISH, or INFISH	+1
	Greater than 50% in wilderness	0
5	Livestock or timber emphasis areas	-1
	Otherwise, and protected under FEMAT, PACFISH, or INFISH	+1
	Greater than 50% in wilderness	0

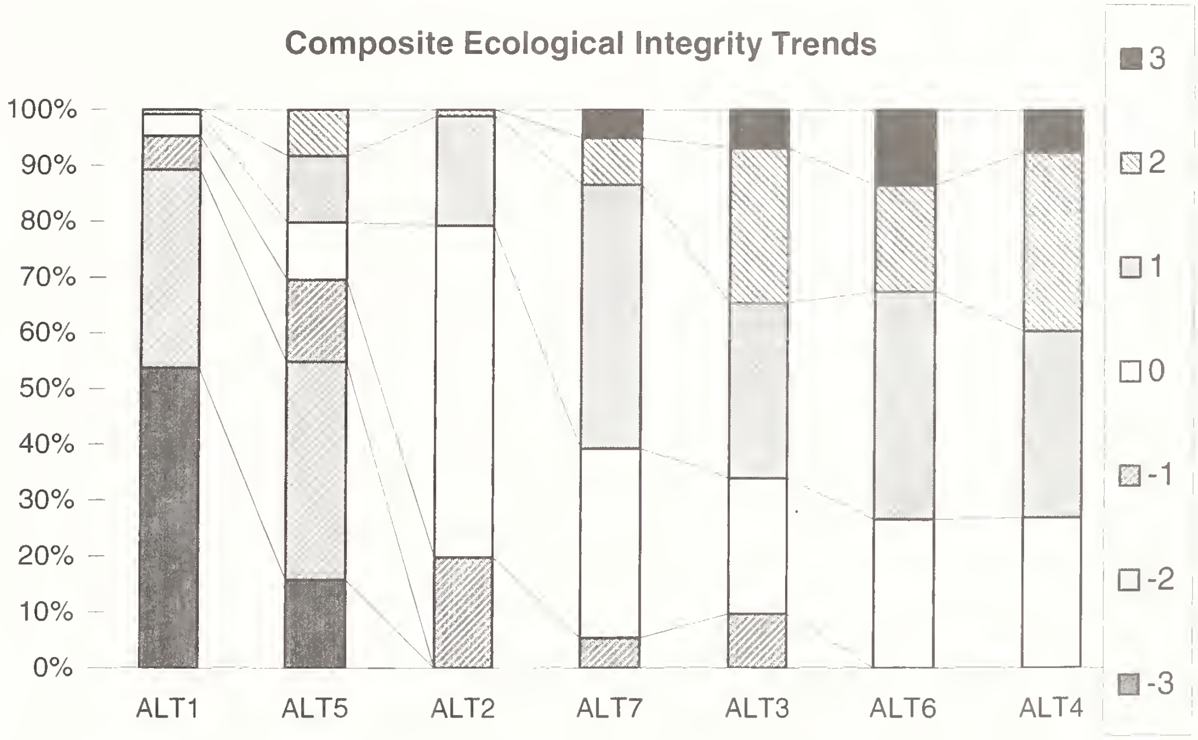
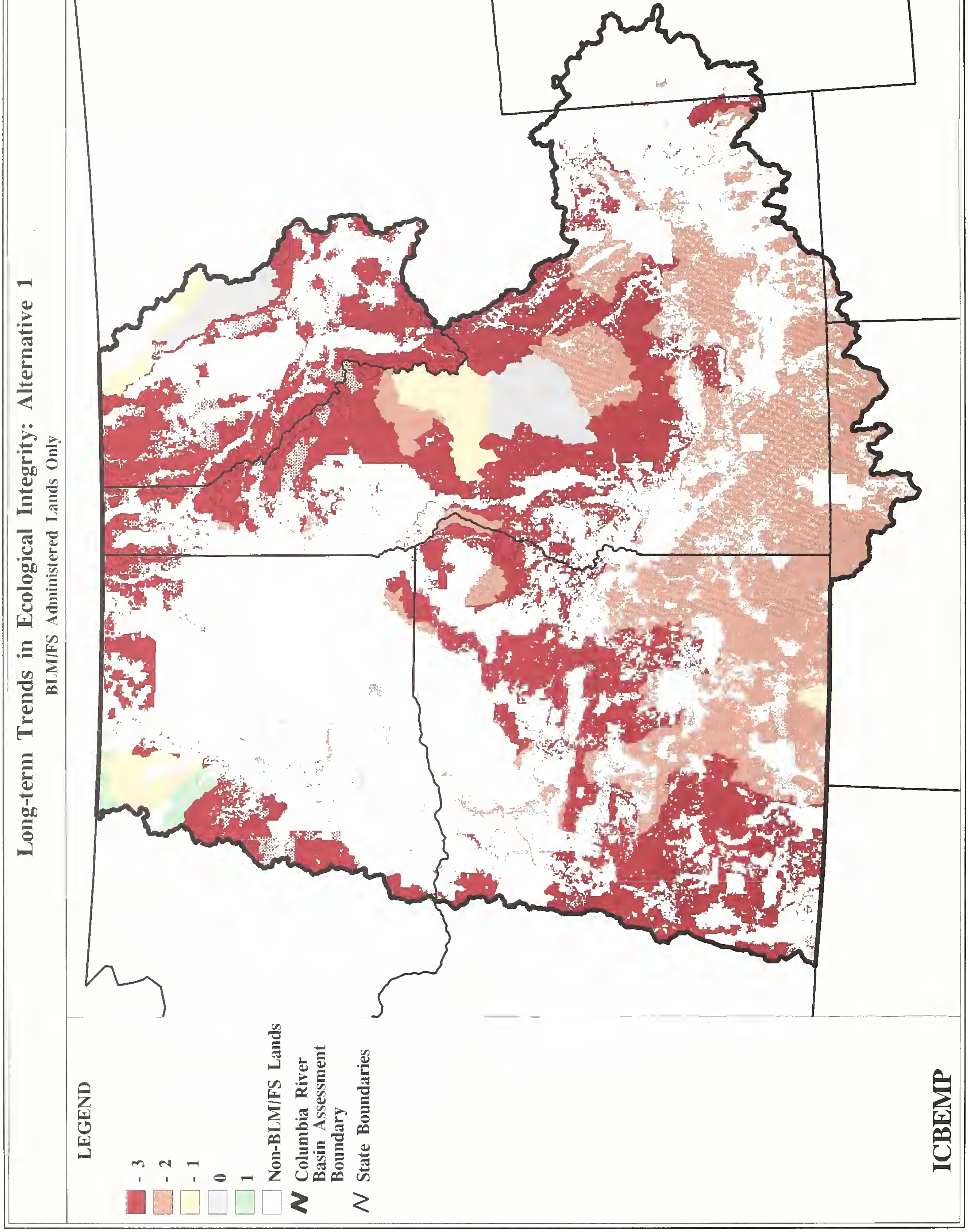
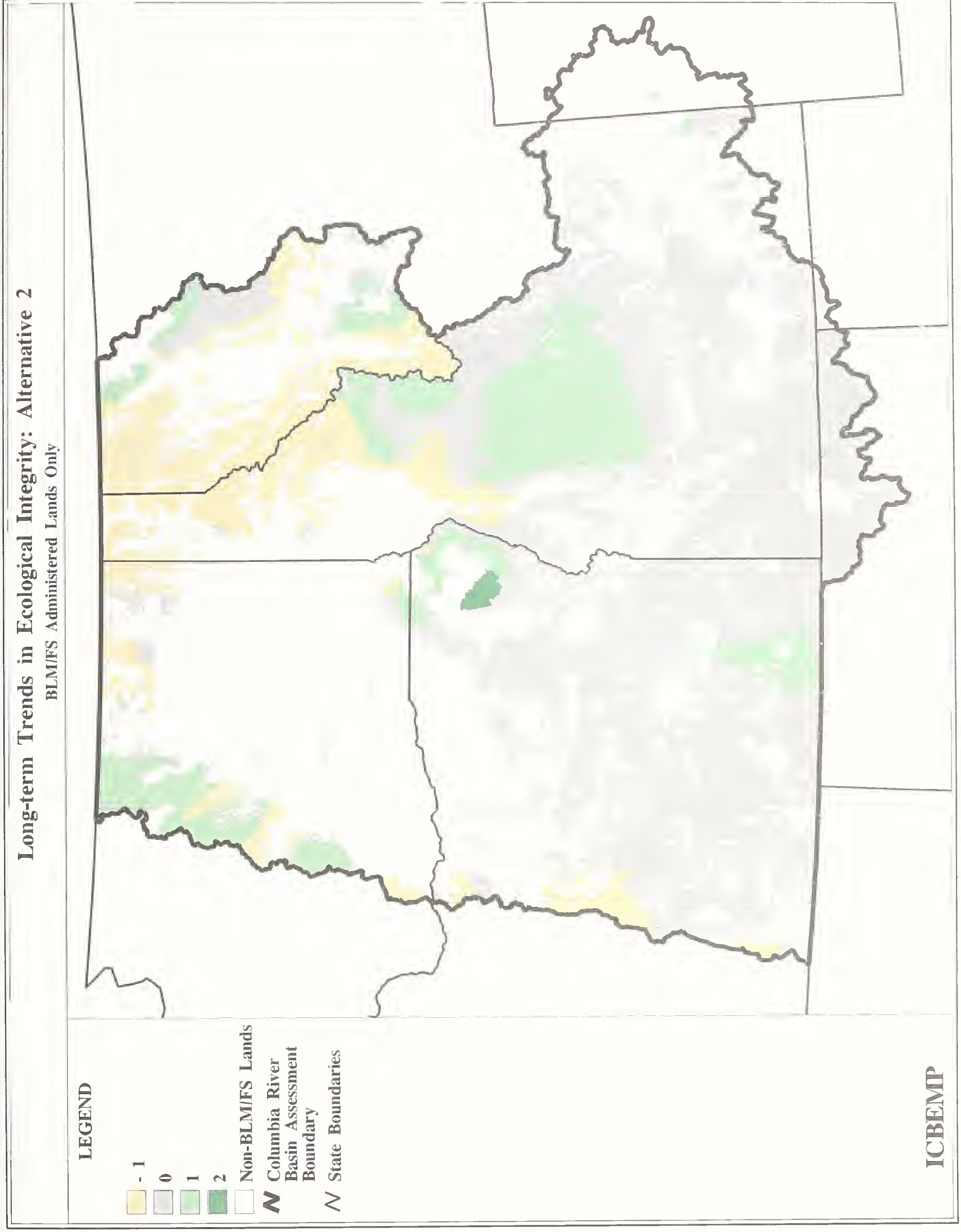


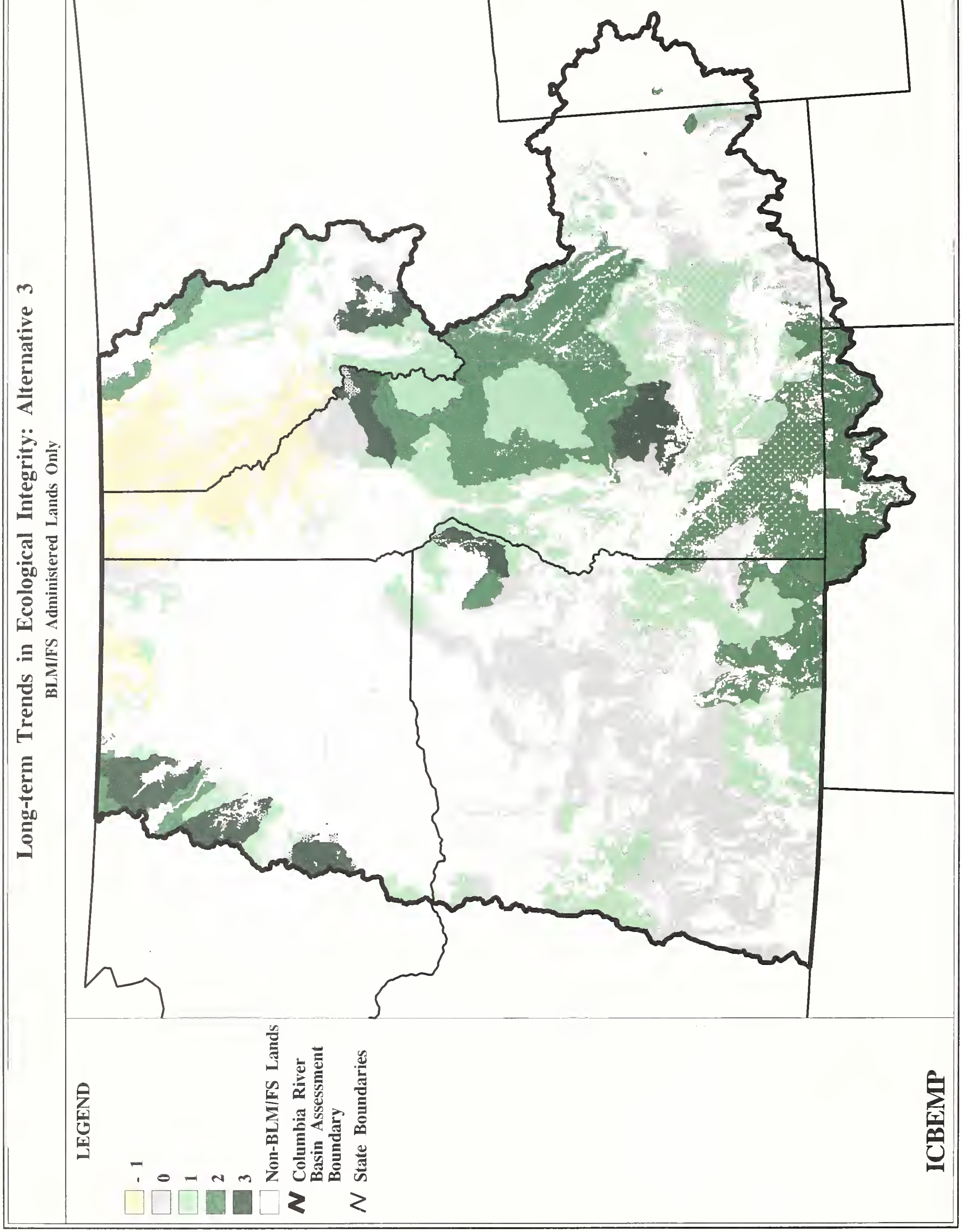
Figure 7.2 – Trends in composite ecological integrity projected for each alternative (-3 is strongly decreasing; 0 is stable; +3 is strongly increasing) on FS- and BLM-administered lands. Note that the alternatives are not in numerical order.



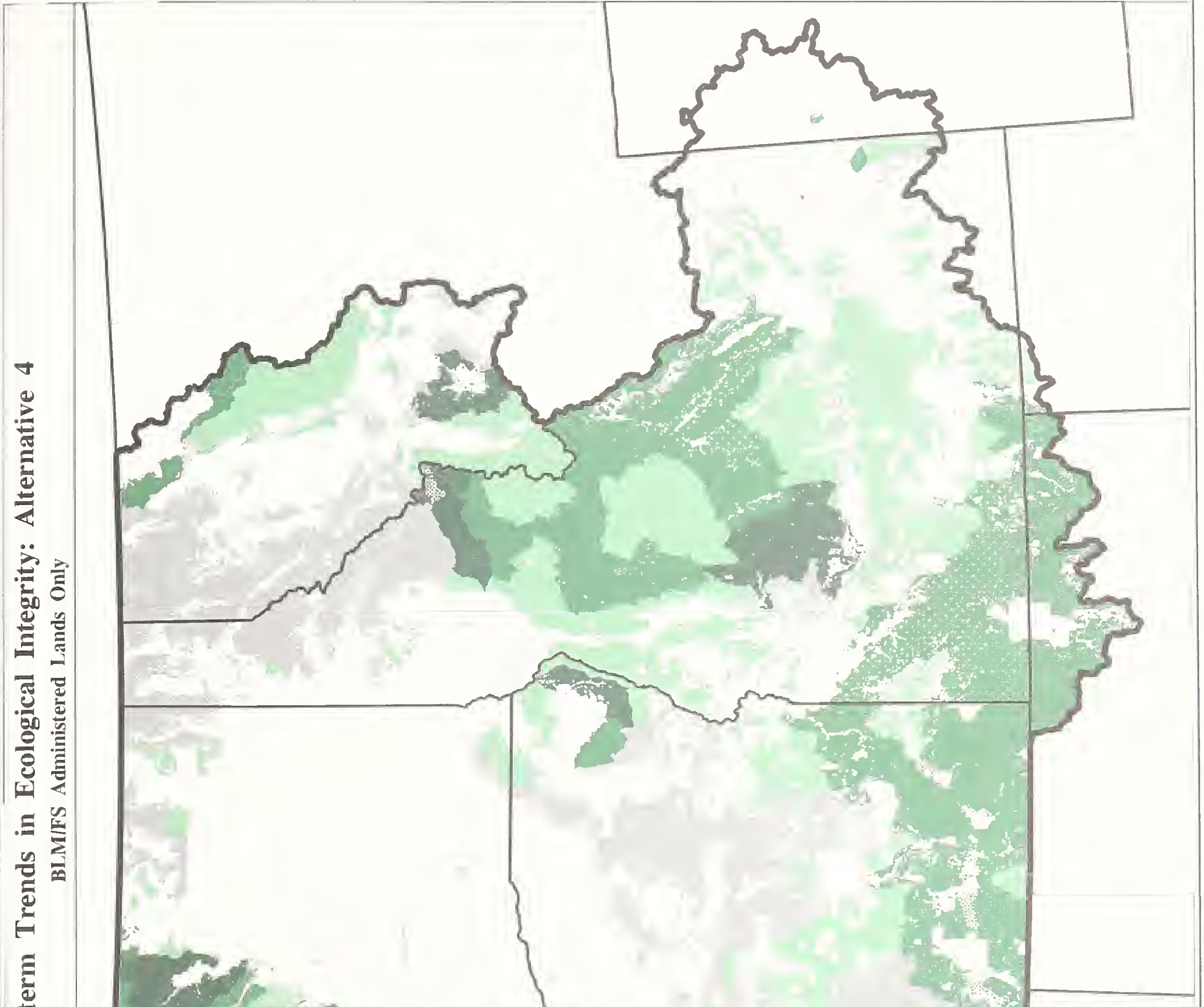
Map 7.2 – Long-term trends in ecological integrity for FS- and BLM-administered land: Alternative 1.



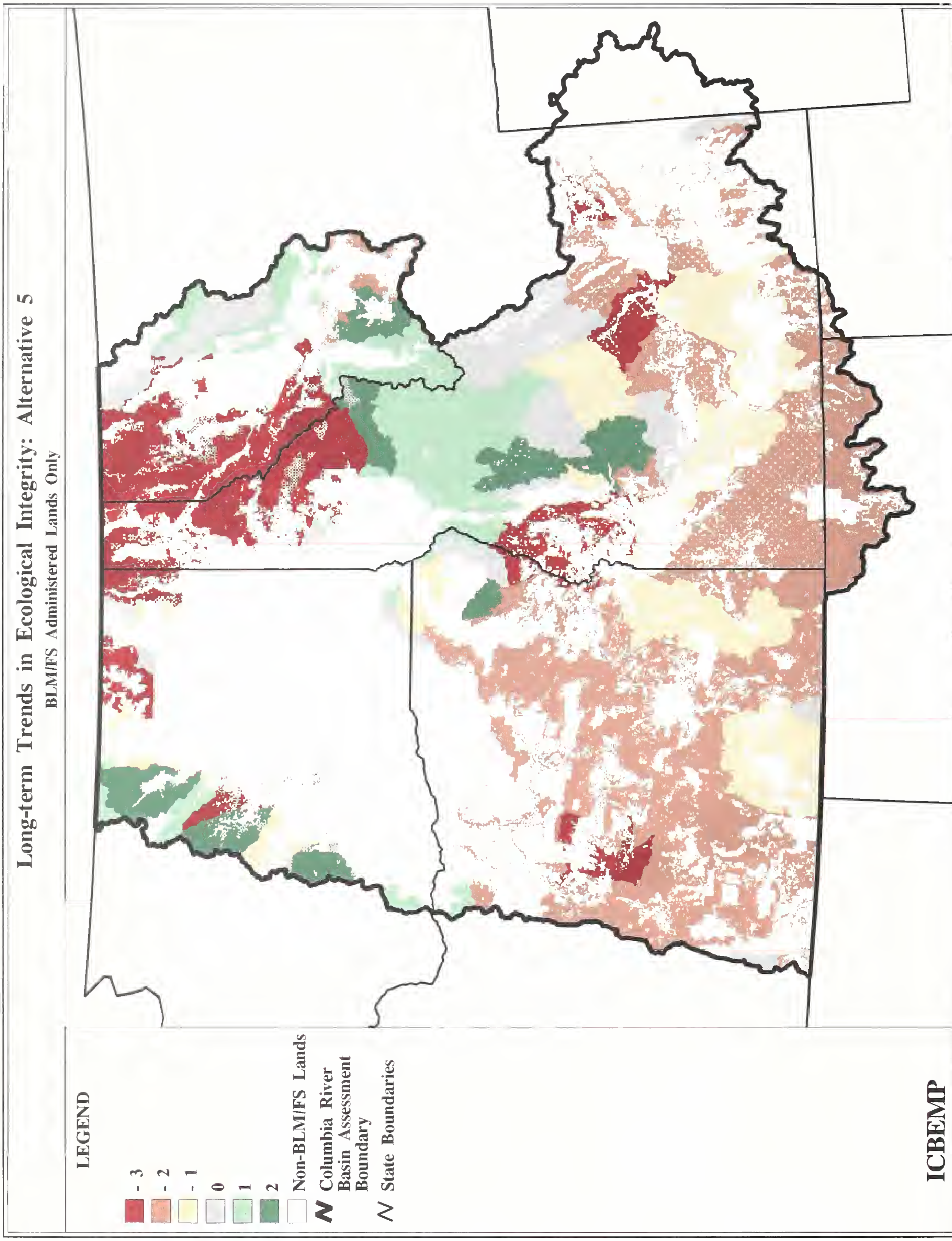
Map 7.3 – Long-term trends in ecological integrity for FS- and BLM-administered land: Alternative 2.



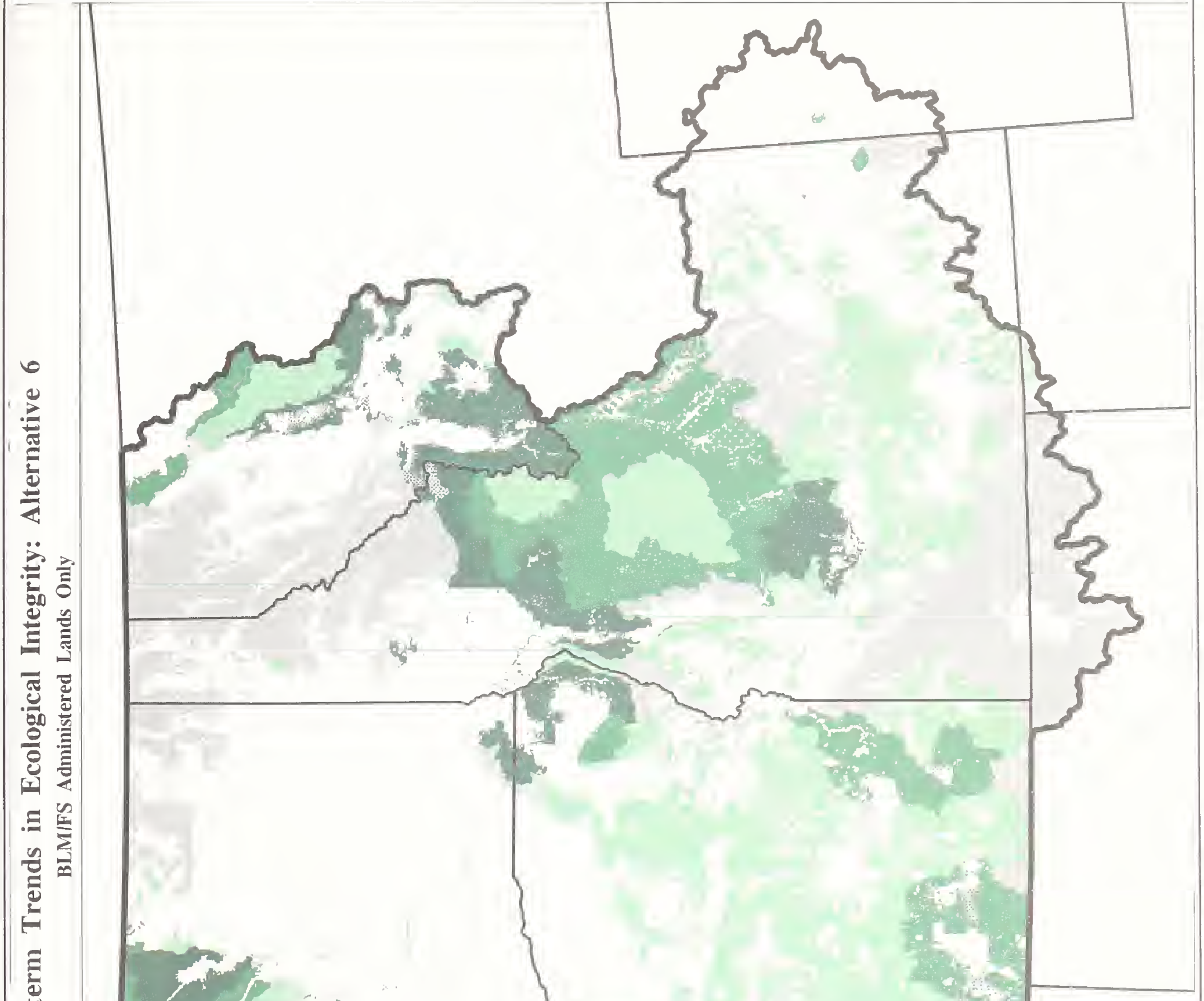
Map 7.4 – Long-term trends in ecological integrity for FS- and BLM-administered land: Alternative 3.



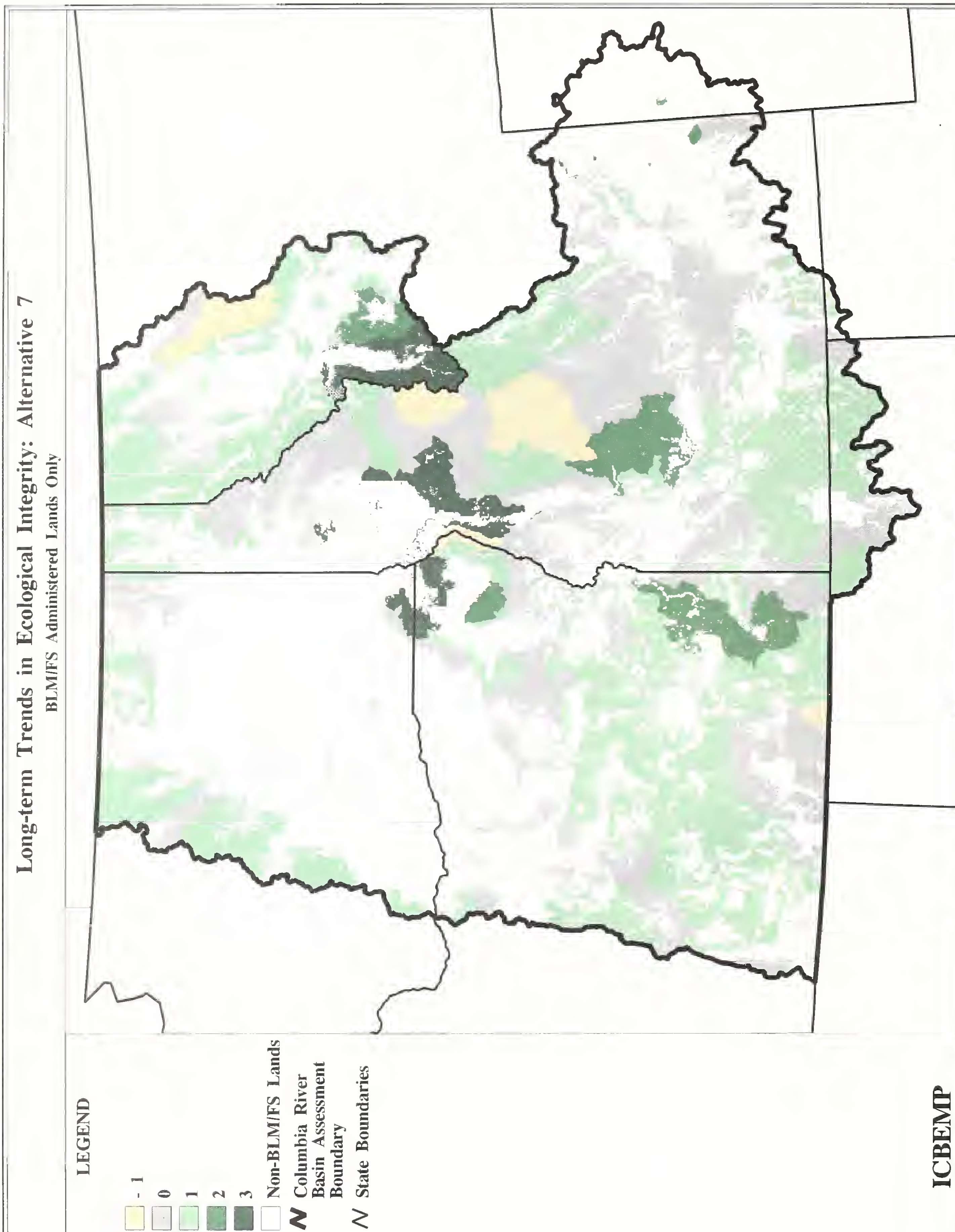
Map 7.5 – Long-term trends in ecological integrity for FS- and BLM-administered land: Alternative 4.



Map 7.6 – Long-term trends in ecological integrity for FS- and BLM-administered land: Alternative 5.



Map 7.7 – Long-term trends in ecological integrity for FS- and BLM-administered land: Alternative 6.



Map 7.8 – Long-term trends in ecological integrity for FS- and BLM-administered land: Alternative 7.

Alternatives 4 and 6 are projected to be successful in stabilizing or reversing negative trends in ecological integrity for FS- and BLM-administered lands. With more detailed and aggressive management it may be possible to project improving trends for some of the lands now predicted to be stable in these alternatives. The outcomes are inter-linked and would require additional analysis to determine the net effects. The basic strategies contained in Alternatives 4 and 6 include additional prioritization of management actions directed specifically at restoring ecological systems, managing vegetation within the capabilities of the biophysical environment, and attempting to achieve vegetation structure and composition consistent with the long-term disturbance processes operating on the landscape.

Social and Economic Resiliency

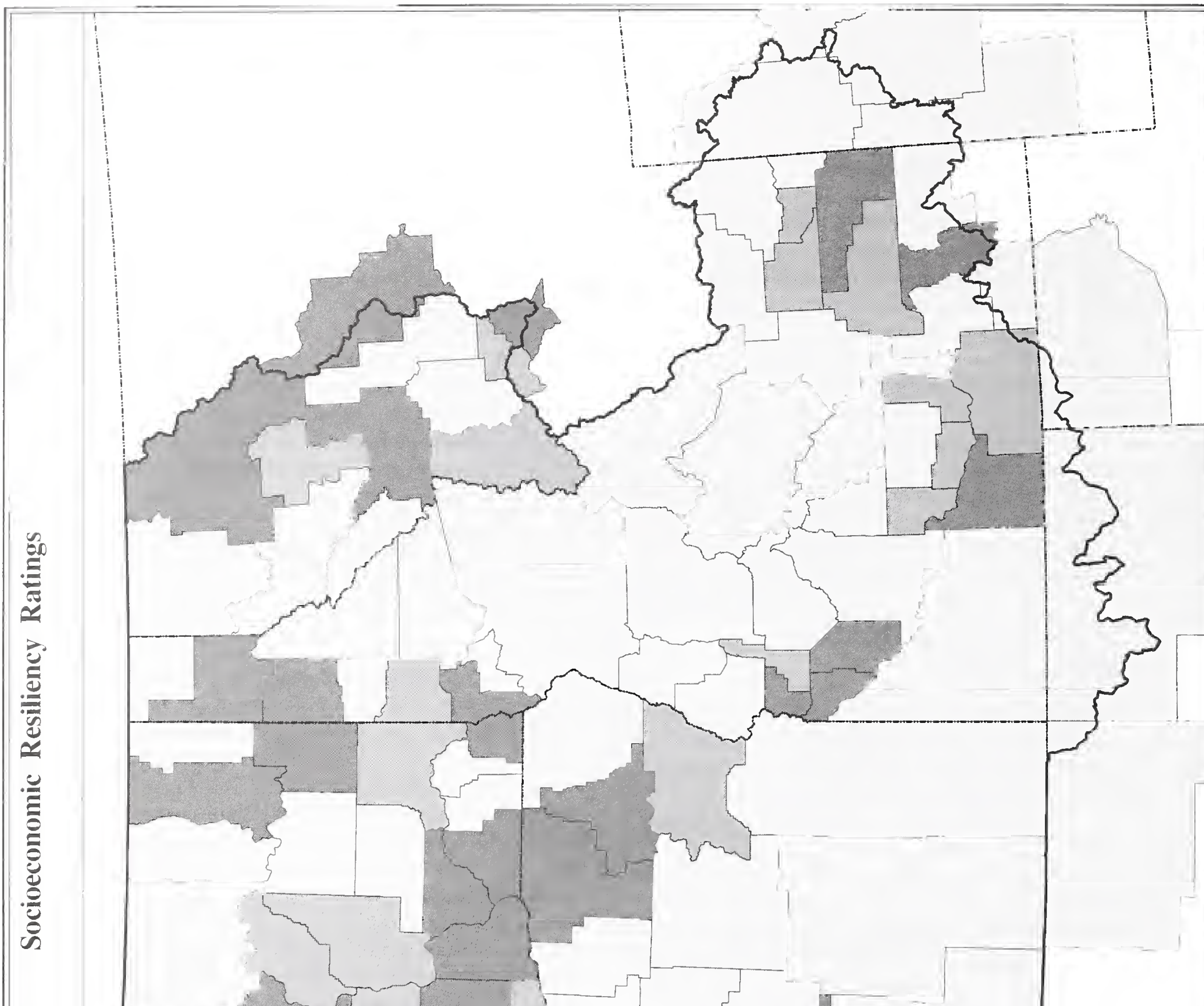
Both social and economic resiliency measure the adaptability of human systems. Social resiliency was measured using four composite factors: civic infrastructure (leadership, preparedness for change); economic diversity; social/cultural diversity (population size, mix of skills); and amenity infrastructure (attractiveness of the community and surrounding area). Economic resiliency was measured by the diversity among employment sectors (using the Shannon-Weaver index). People in highly resilient counties are assumed to have ready access to a range of employment opportunities if specific firms or business sectors experience downturns. Much like the biophysical components of the ecosystem, social and economic resiliency are affected by the size of the area measured (community, county, or trade regions) but reflect human ideas about the landscape rather than hydrologic subbasins. In general, larger units display greater economic diversity (and by extension, economic and social resiliency) than smaller areas. Further, since resiliency attempts to measure a capacity for human response, classifications of either social or economic resiliency serve as relative estimates of adaptability, rather than absolute descriptors.

When we look at the Basin from the socioeconomic perspective our basic frame of reference is how humans organize themselves both in a community sense and how they relate to their biophysical environment. One overarching feature of this perspective is the speed at which human communities, interests, values, and economies change. Given this feature, one useful relatively permanent administrative feature is the county. We observe that counties and available county data can be used to describe broad trends in socioeconomic resiliency. Another powerful argument for considering counties is their role as political entities in a political system that simultaneously relates federal/state/local interactions.

Current Socioeconomic Resiliency

Socioeconomic resiliency draws from measures of social and economic resiliency separately (Quigley and others 1996). These measures can be combined into a single measure and used to assess the EIS alternatives. This composite rating combines three factors that are included in discussions of social and economic resiliency: population density (defined as population per square mile), economic resiliency (defined as diversity of economic sectors), and lifestyle diversity (see Haynes and Horne, in press, for a more detailed discussion). We assigned the socioeconomic resiliency ratings based on the sum of the total ratings for each of the three factors where each was weighted equally. The ratings were developed for each of the 100 counties in the Basin (map 7.9). Counties are one of the few permanent geographic features of human systems.

Low socioeconomic resiliency rating — This includes the Basin counties with low population density (<11 people per square mile), low or medium economic resiliency and low or medium lifestyle diversity. There are 54 counties in the Basin in this category. These counties account for 68 percent of the area but only 18 percent of the population. As shown in map 7.9, many of the counties traditionally thought of as agricultural are in this category. There are 14 counties that have medium economic resiliency, but most of them are among the least densely populated counties in the Basin (fewer than 6 people per square mile) and most contain FS- and BLM-administered lands.



Map 7.9 – Socioeconomic resiliency ratings are the sum of ratings for economic resiliency, population density, and lifestyle diversity.

Medium socioeconomic resiliency rating — This includes the 20 Basin counties with mostly medium economic resiliency ratings and generally medium or high lifestyle diversity or population density ratings. Exceptions include Klickitat county, which has low economic resiliency and high lifestyle diversity; and Cassia county, which has low population density but medium economic and lifestyle diversity. Baker county has the lowest population density ratings, but a medium level of economic resiliency reflecting a diverse economy, and the highest level of lifestyle diversity reflecting greater adaptability of its social systems.

High socioeconomic resiliency rating — This rating includes the 26 Basin counties that are more densely populated (greater than 11 people per square mile), and have the highest level of economic resiliency. Counties with high social/ economic resiliency typically have high population densities, medium economic resiliency, and medium to high lifestyle diversity values. The exceptions to these are Klamath county, which has low population density but high economic resiliency and high lifestyle diversity and Silver Bow county that has low economic resiliency, but high population density and high lifestyle diversity. High lifestyle diversities in these two counties suggest that there are higher infrastructure values than the low population densities would suggest.

This approach recognizes the 44 (of 100) counties with very low (less than 6 people per square mile) population densities, sometimes called "frontier counties." Typically these counties have low socioeconomic resiliency, and include many of the 60 Basin counties labeled "federal" in the sense that more than 33 percent of their area is in federal ownership. The interest in identifying these so-called "frontier counties" is a concern that they may lack sufficient population to sustain existing services or to develop necessary social services. A related concern is whether they are able to maintain the existing infrastructure both in the physical sense and in the social sense, especially in the sense of community. One example is counties that are too sparse to sustain a medical clinic. This relative isolation also stimulates some people to locate in these areas. That is, some people choose these counties specifically because they are sparsely settled.

We caution against concluding that low to high ratings are equivalent to bad to good ratings; the intent is to describe the adaptability or vulnerability of these counties, not to rate them as good or bad. Generally, most of the people in the Basin (82%) live in counties that are medium or high in the degree of adaptability, as measured by socioeconomic resiliency (fig. 7.3). Most of the land area (68%) in the Basin, however, is in the low category for socioeconomic resiliency.

Trends in Socioeconomic Resiliency

The only component of socioeconomic resiliency in which we have ability to project trends is population density. But we can use population density as a proxy for socioeconomic resiliency to make some broad assessments about future resiliency trends. We can do this because economic resiliency, lifestyle diversity and population density vary directly with each other. That is, these factors seem to be collinear which suggests that any one of these three factors can be used as a proxy for the others.

As of 1994, the population of the Basin was 3.1 million. Population projections suggest that the Basin's 100 counties may have 6.0 million people by 2040 (McCool and Haynes 1996). This is a growth rate higher than the population growth rate for the United States as a whole. In these projections, the population density ratings for 61 counties remained unchanged. The remaining 39 counties shifted to a higher category of population density. Figure 7.4 illustrates these trends in terms of both the distribution of population density categories by population and by area. By 2040, nearly 80 percent of the population (up from 60 percent currently) is projected to live in relatively urbanized environments. The proportion of the people living in the most rural parts of the Basin falls by 50 percent. The area in the lowest population density category changes from 68 percent to 45 percent of the Basin.

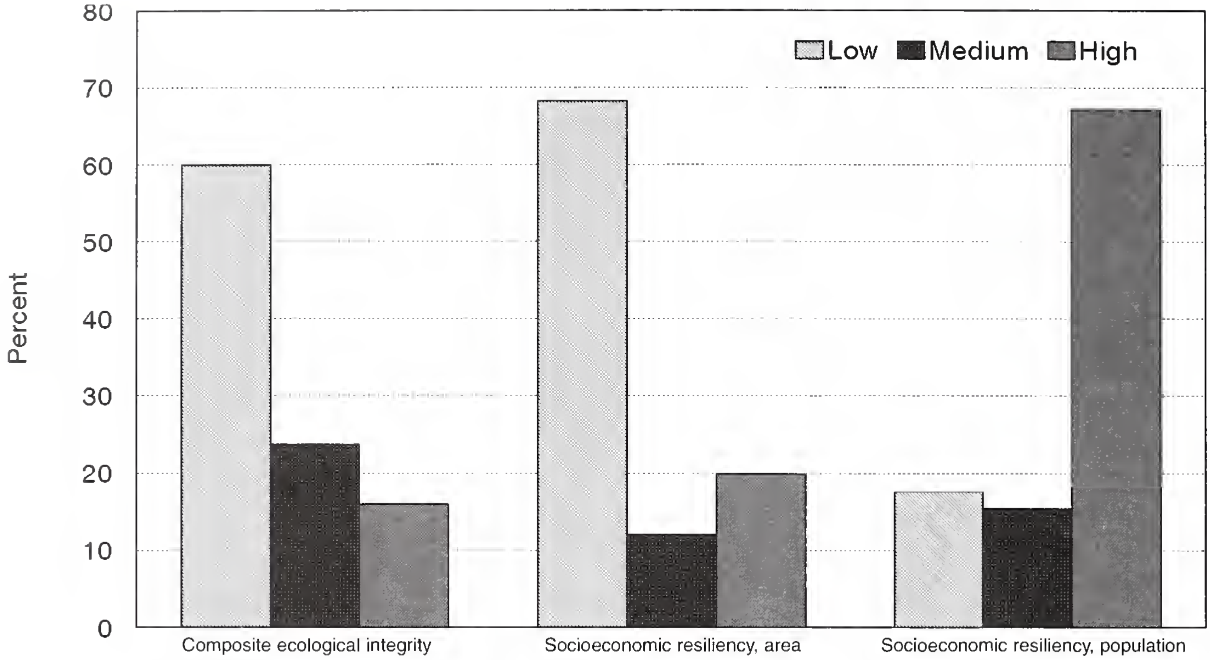


Figure 7.3 – Percentage of the Basin by ecological integrity and socioeconomic resiliency ratings.

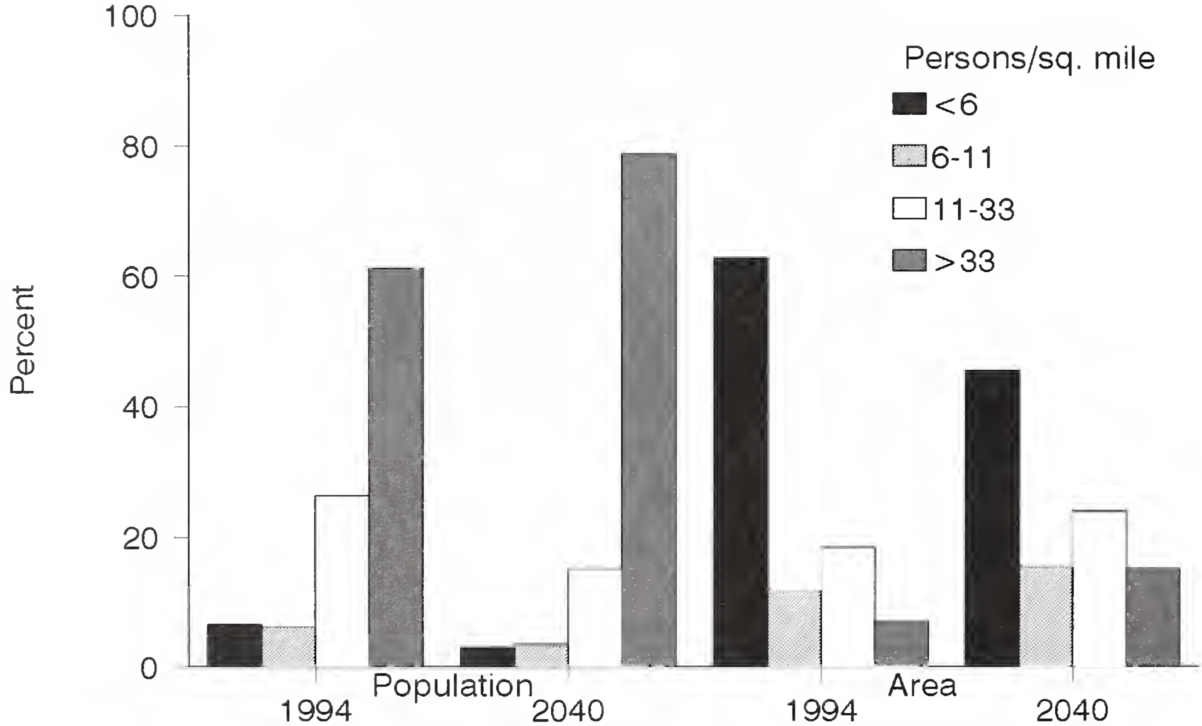


Figure 7.4 – Distribution of population density categories by area and population of 1994 and 2040.

Because of the projected increase in Basin population, there are likely to be more people in the high density counties. This is particularly true in "recreation" counties that are projected to attract a disproportionate numbers of in-migrants (McCool and Haynes 1996). In terms of socioeconomic resiliency, this means a continued shift toward higher socioeconomic resiliency throughout the Basin, with the exception of the "frontier" counties that are not recreation counties or that have low economic resiliency. None of the 100 counties are projected to lose population between 1995 and 2040; less than 10 percent of the counties are projected to have only minor increases. As other areas become more densely populated, these few counties (less than 10%) are likely to become increasingly isolated and to have difficulty attracting infrastructure and investments. On the other hand, they are likely to be more apparent as "refuges" for people seeking solitude.

Predicting trends for socioeconomic resiliency is difficult because of the inherit uncertainty in social systems (because of both the speed at which they change and the uncertainties inherit in the underlying assumptions). Ten year trends in county level economic resiliency that might be attributed to the adoption of alternative management strategies on FS- and BLM-administered lands are related to projected population growth, reliance on FS and/or BLM forage, reliance on harvest of FS and/or BLM timber, recreation opportunities, and initial levels of economic resiliency (see the Economic chapter of this report for further discussion). These trends show 17 counties that might experience possible change in economic resiliency within the Basin. Weighting these counties by the proportion of Basin population they represent shows that only a fraction of the population might experience a downturn in economic resiliency. This is not to downplay the significance of the potential impacts, but rather to place them in perspective. Comparing this small percentage of the population against the relatively large percentage of the Basin area that might experience a downturn in ecological integrity can be deceptive. Ecological integrity trends are judged with respect to forest, rangeland, and watershed conditions and management, with little interaction with prospective human impacts on either management or changes in the mix of ecosystem goods, services, and conditions. Economic resiliency trends speak to the entire economic system within the Basin. As such, they include goods, services, and conditions from forest and range ecosystems as well as the other parts of the Basin. They also only speak to the conditions in the first decade of the planning period (where the trends in ecological integrity speak to changes expected in the next 100 years).

In the long term, population changes are a proxy for expected economic changes in the Basin (see Haynes and Horne, in press, for projections of economic activity in the Basin for some of the major resources). Projected population shifts over the next 50 years suggest the Basin would come to look like much of the West in that it would become primarily urban. There would still be 45 percent of the Basin's area that would be in the lowest population class that we call "frontier" counties. Those counties would likely continue to generate concerns about their ability to provide social services without help from State and Federal governments. It is expected that concerns about social resiliency would be most pronounced in these counties. There is little that FS and BLM managers can do about this. Political factors are involved in each particular location in addition to the socioeconomic trends. Some people choose these counties specifically because they are sparsely settled.

There is often the concern about the link between human conditions (and well-being) and the condition of the underlying ecosystems. Comparing socioeconomic resiliency by area may cause some to conclude that people in the Basin have impoverished themselves and that ecosystem and human community sustainability is imperiled. Such a view at the Basin level leads to erroneous conclusions. First the forest and rangeland ecosystems do not themselves provide the economic foundations of the Basin. Second, many of the ecosystems have been modified by human action to increase

their production of native (for example, timber and grass) or exotic (for example wheat or cattle) crops or animals.

Risk Assessment: Human Ecological Interactions

We assessed future risk to ecological integrity in relation to people (growth in rural-urban areas and use patterns) and risk to people and their assets in relation to wildland areas. The underlying assumption is that risk to ecological integrity is generally higher in proximity to densely populated areas, and risk to people and their assets is generally higher in close proximity to wildland areas, rather than to agricultural or urban areas. Natural or human-induced events that occur within wildland areas may prove risky to people, homes, and other assets people value. Those risks are related to wildland areas and conditions associated with wildland areas. The integrity of ecosystems is also influenced by the presence of people and their activities.

Current Risks Associated with Human-wildland Interaction

We considered four population/wildland interface classes. The areas with moderate or greater road densities within a 60 mile radius of the metropolitan areas in the Basin were classified as very high. The concept was to identify the areas likely to be inhabited by commuting residents and experiencing strong pressure to expand subdivisions, developed recreation sites, and other structures. Areas with more than 1,000 persons were mapped using a 10- to 30-mile radius depending on the population of the city. Areas with fewer than 1,000 persons were classified as low, while the degree of overlap of the city buffers with each other resulted in moderate or high levels. Societal risk to ecological integrity and risk to human assets from interactions with wildland was estimated using a rule set that related population density to forest, non-forest, and agricultural wildland vegetation groups. Higher population densities in proximity to forest and rangeland vegetation types were rated as having higher risk than low population density areas. Agricultural lands were rated with lower risks than forest and rangeland areas (table 7.6).

To estimate the risk associated with the FS- and BLM-administered portion of the wildland areas, a rule set was developed that related urban-rural classes to FS and BLM vegetation groups (table 7.7). This relationship assumes a higher risk is associated with forested vegetation groups than with non-forested vegetation types and a higher risk with increasing population densities.

Trends in Risks Associated with Human-ecological Interaction

Trends in risk to ecological integrity on FS- and BLM-administered land from interactions with people, and trends in risks to human assets from FS- and BLM-administered lands were assumed to shift in relation to the future urban-rural classes and trends in composite ecological integrity. In general, the relationship assumes that if urban-rural classes become higher and if trends in ecological integrity are negative, then trends in risks generally increase (table 7.8). Future urban-rural classes (table 7.9) were based on projected population densities (very low, low, moderate, and high) that were calculated for each subbasin. The underlying projections of population change within the Basin were taken from McCool and Haynes (1996).

Results and Discussion

Floods, wildfire, road slumping, culvert plugging, cougars frequenting backyards, and deer and elk damaging ornamental shrubs are all examples of increasing risks associated with living in close proximity to wildland areas. Generally the more wild the area the higher the risk, and the more human populations increase in close proximity to wildland areas the greater the risk. A symmetric relationship was assumed to exist concerning the risks to the integrity of wildland areas from human influence and the risks faced by humans in proximity to wildland areas. Road building, fishing, camping, hiking, wood cutting, berry picking, and developed recreation sites are all examples of activities that tend to increase in wildland areas in close

Table 7.6 – Societal risk to ecological integrity from human interactions and risk to human assets from wildland areas.

	Urban-Rural Classes			
	Low	Moderate	High	Very high
Forest vegetation types	Low	Moderate	High	Very high
Non-forest vegetation types	Low	Moderate	Moderate	Very high
Agricultural types	Low	Moderate	Moderate	High

Table 7.7 – Risk to FS- and BLM-administered land ecological integrity from human interactions and risks to human assets from FS- and BLM-administered lands.

	Urban-Rural Classes			
	Low	Moderate	High	Very high
FS/BLM Forest vegetation types	Moderate	High	High	Very high
FS/BLM Non-forest vegetation types	Low	Moderate	High	Very high
FS/BLM Other	Low	Low	Moderate	High
Non-FS/BLM	None	None	None	None

Table 7.8 – Trends in risk to FS- and BLM-administered land ecological integrity from human interactions and trends in risks to human assets from FS- and BLM-administered lands under conditions of increasing, stable, and decreasing ecological integrity trends.

Trend in Ecological Integrity	Future Urban-Rural Classes			
	Low	Moderate	High	Very high
+3	Decreasing	Decreasing	No Change	Increasing
+2	Decreasing	Decreasing	No Change	Increasing
+1	Decreasing	No Change	Increasing	Increasing
0	Decreasing	No Change	Increasing	Increasing
-1	No Change	Increasing	Increasing	Increasing
-2	No Change	Increasing	Increasing	Increasing
-3	No Change	Increasing	Increasing	Increasing

Table 7.9 – Future urban-rural class given population increase class and current urban-rural class.

Current Urban-rural class	Future Population Density Class			
	Low	Moderate	High	Very high
Low	Low	Low	Moderate	High
Moderate	Moderate	High	High	Very high
High	Moderate	High	Very High	Very High
Very High	Very High	Very High	Very High	Very High

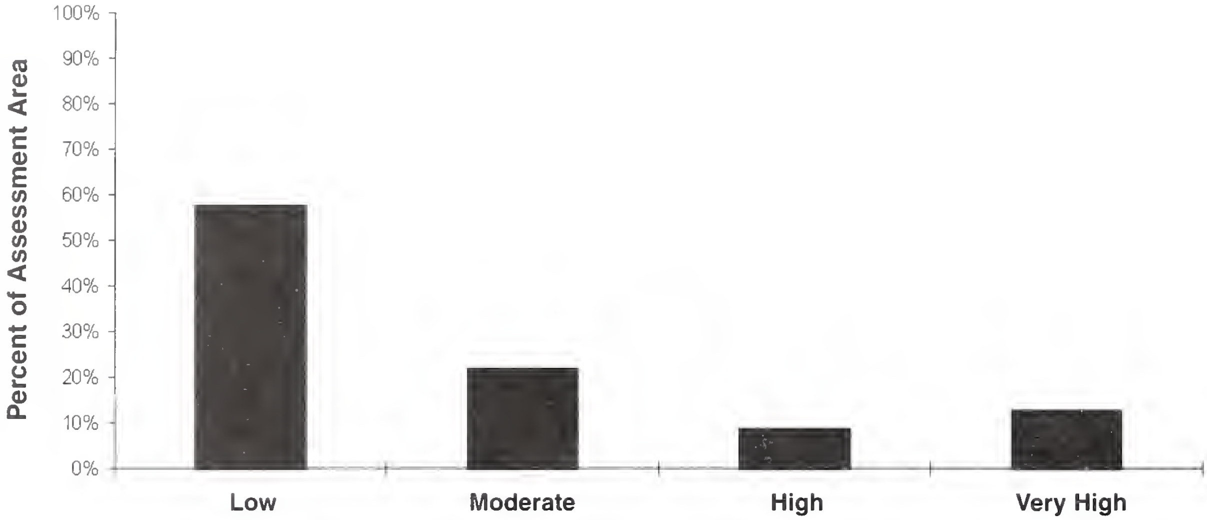


Figure 7.5 – Societal risk of human-ecological interaction: percent of the Basin with low, moderate, high, or very high risk associated with the management of human ecological interactions.

proximity to population centers. The larger the population center, the higher the activity levels. These activities tend to create risk to ecological integrity. Recreation tends more toward developed site recreation while still supporting increased dispersed recreation.

Risks associated with the interaction of urban and wildland areas are associated with the six major metropolitan areas within the Basin (Boise, Nampa/Caldwell, Missoula, Spokane, Kennewick/Pasco/Richland, and Yakima). Missoula, Boise, Nampa/Caldwell, and Yakima are in close proximity to FS- and BLM-administered lands and therefore are anticipated to have a greater risk associated with the interface of FS- and BLM-administered wildlands than Spokane or Kennewick/Pasco/Richland. Spokane does have substantial wildland interface risks, but they are mostly associated with private land. Kennewick/Pasco/Richland is a mixture of wildland and agricultural interfaces. Where these metropolitan areas are in close proximity to high integrity wildlands, risks to the maintenance or improvement of integrity would be high. Likewise these metropolitan areas would pose greater risk to areas of high integrity in close proximity than to areas of low integrity, suggesting the need for additional emphasis to manage the risks to attain and maintain high ecological integrity.

Considering all land within the Basin, approximately 58 percent of the area is classed as low urban/rural class with approximately 23 percent classed as high or very high. This reflects the low density of population within much of the Basin. Translating this societal risk to ecological integrity from interactions with humans and the risk to human assets from wildland areas, about 58 percent of the Basin has low risk and 21 percent has

high or very high risk (Figure 7.5). Thus the majority of the area in the Basin would be viewed as having low risk from a societal standpoint. Risks vary by location with very high risk associated with the major metropolitan areas in the Basin (map 7.10). Using this as a frame of reference, the view from a FS or BLM manager's frame of reference would be slightly different (map 7.11 and fig. 7.6). Removing the non FS- and BLM-administered lands from consideration and recalculating the risk to ecological integrity from human interactions and the risk to human assets from wildlands, shifts to greater risk in general. On FS- and BLM-administered lands nearly 50 percent of the land is classed as moderate risk while about 19 percent is classed as high or very high. Thus, from the FS/BLM perspective there are more risks involved with managing the wildland areas than might be viewed by society as a whole. Forested vegetation occurring in areas of moderate urban-rural classes results in high risk from the FS and BLM manager's perspective, while society might consider this as a moderate risk to all ownerships.

Managing risks in areas where populations are increasing becomes more complex as fewer options for treatment become available. Managing smoke from prescribed fire, reducing tree densities in areas with high scenic values, fencing riparian areas frequented by recreationists, and allowing flooding to occur naturally in stream channels are all examples of increasing complexity as human populations increase in proximity to wildland areas.

Nearly 60 percent of the Basin is rated as having low composite integrity (see map 7.1) with only

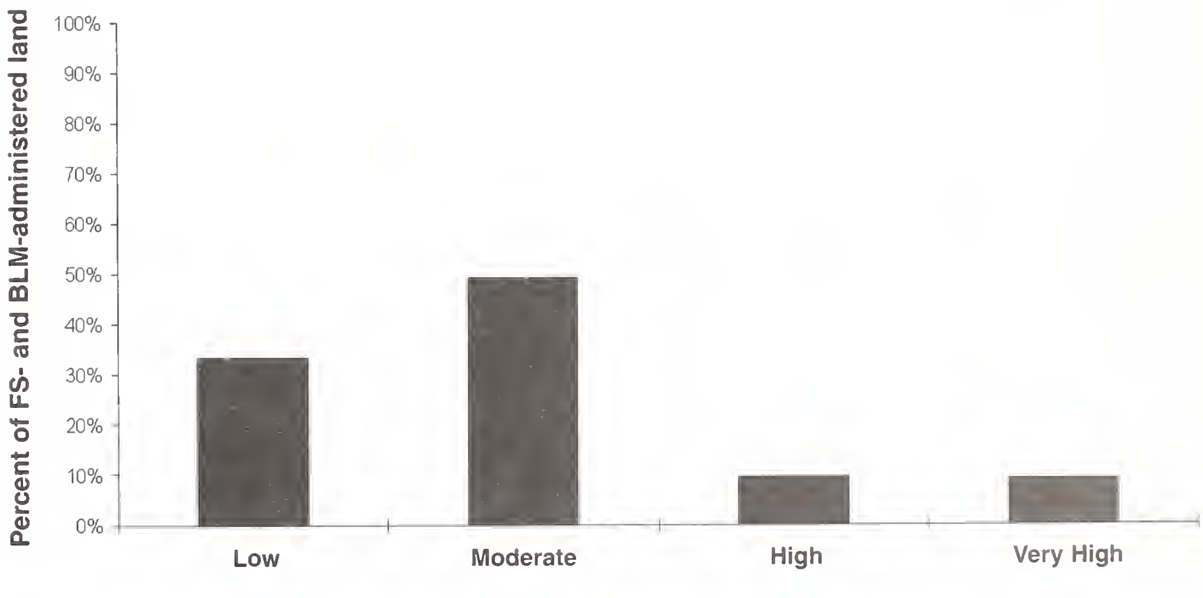


Figure 7.6 – FS/BLM risk of human-ecological interaction: percent of FS- and BLM-administered land with very high, high, moderate, and low risk associated with the management of human ecological interactions.

17 percent rated as high. The interaction across ownerships is important to consider as new management direction is proposed. Over 80 percent of the area rated as having high composite ecological integrity is on FS- and BLM-administered lands. If the long-term goal is to maintain high integrity areas and move more area into the high integrity class, FS- and BLM-administered lands become important resource areas because of their integrity.

The increasing population of the Basin results in trends toward more risks to ecological integrity from human interactions and risks to human assets from wildlands across each alternative (maps 7.12 through 7.18). This despite the stable or favorable trends in ecological integrity projected for Alternatives 4 and 6. All alternatives show at least 20 percent increasing risks; Alternatives 1 and 5 show more than 50 percent increasing risk. Alternative 1 shows no areas of decreasing risk. The areas generally showing increasing trends in risk are those near major population centers where populations are expected to increase rapidly, and in areas associated with downward trends in ecological integrity. [Alternatives 4 and 6 were projected to have stable or improving trends in ecological integrity, thus increasing risks in human ecological interactions are associated with increasing populations.] In Alternatives 1 and 5 where substantial areas were showing rapid declines in ecological integrity trends (values of -2 or -3), the trends in risk are originating from both increasing population and declining ecological integrity trends.

Risks to integrity are shown as increasing even in areas composed mostly of existing wilderness. This implies that human-ecological interactions in these areas result in increasing risk to ecological integrity if ecological integrity trends are decreasing. The arguments are that declining ecological integrity would place people at greater risk (more uncertain outcomes for flood, wildfire, and other events) and that people interacting with these areas would be increasing the risk to integrity (camping along streams that are not improving in integrity, more people accessing the wildland areas, increasing probability of noxious weed spread, and other risks). If ecological integrity is trending upward, the system is more resilient and trends in risk to human assets and risk to ecological integrity from human use would be less.

Even with improving trends in ecological integrity, risks to ecological integrity from people and risks to human assets from wildland areas will be increasing due to population increases in the Basin. Thus, FS and BLM managers can anticipate that managing for ecological integrity will involve managing increasing risks from the association of people with wildland areas and risks to human assets from wildland areas.

There is little difference between the alternatives for the Interstate 90 (Spokane, Washington-Missoula, Montana) or Interstate 84 (Ontario, Oregon-Twin Falls, Idaho) corridors. Alternatives 3, 4, 6, and 7 generally do make a difference by lowering the risks in the area east of the Cascades and in the area west of Yellowstone National Park. Risks to ecological integrity in the Kennewick/Pasco/Richland area with its large private land base and other Federal lands is unaffected by the various FS and BLM futures. In the area east of the Cascades there are two areas (west of Yakima, Washington and east of Bend, Oregon) where a growing human population may overwhelm management attempts to lower risks within the alternatives.

There are three additional geographic regions where different land management approaches are unable to alter the risks to ecosystems and where increasing human populations are not the source of increased risks. These are the areas east of Missoula, Montana along the continental divide, the area from Ontario, Oregon to Baker City, Oregon (along Interstate Highway 84), and the area further east of Bend, Oregon. In these areas the level of restoration actions envisioned in the alternatives are inadequate to reverse the increasing trends in ecological and human risks.

Risks to human assets from wildland areas and risks to ecological integrity are not restricted to metropolitan areas. Much of the Basin is expected to remain rural where risks are associated with res-

idents, and remain in primitive areas where risks are associated with visitors. Local publics would be expected to continue to express preferences for stability in scenery and lobby to have projects put in someone else's backyard. Recreation use is expected to increase sharply, leading to greater conflicts between recreation use and land management actions including the issue of road closures. The proportion of the Basin that is sparsely populated and where Federal agencies are a visible part of the communities is projected to change very little and would continue to place demands on Federal resources to be part of their community infrastructures. This would be the case especially in the area of risk management, where these counties have fewer resources to address risks or assist in control of natural events such as wildfire, flood, and insect outbreaks than exist in the more heavily populated areas.

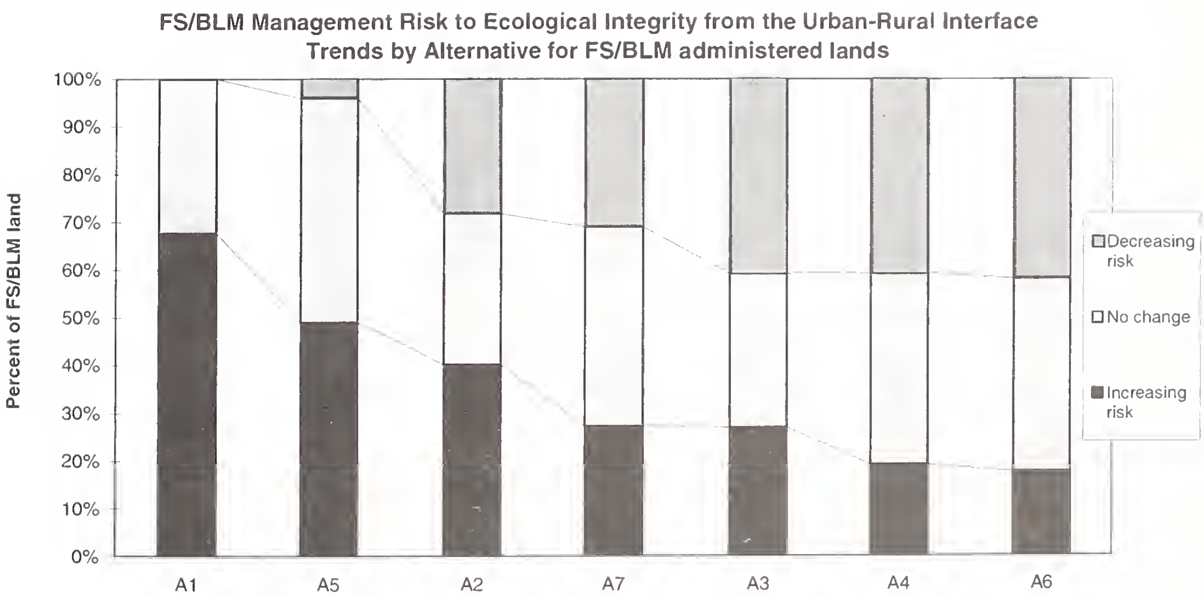
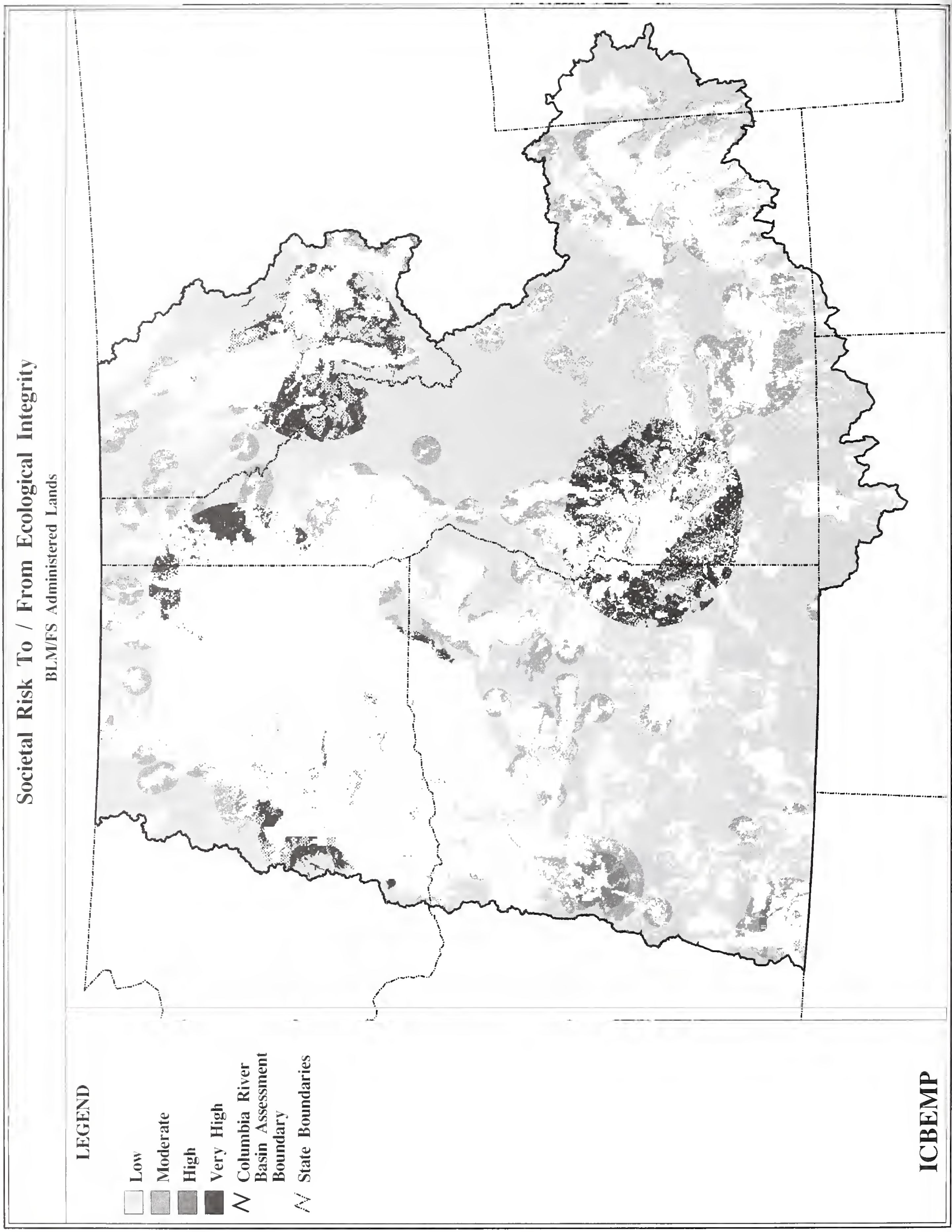
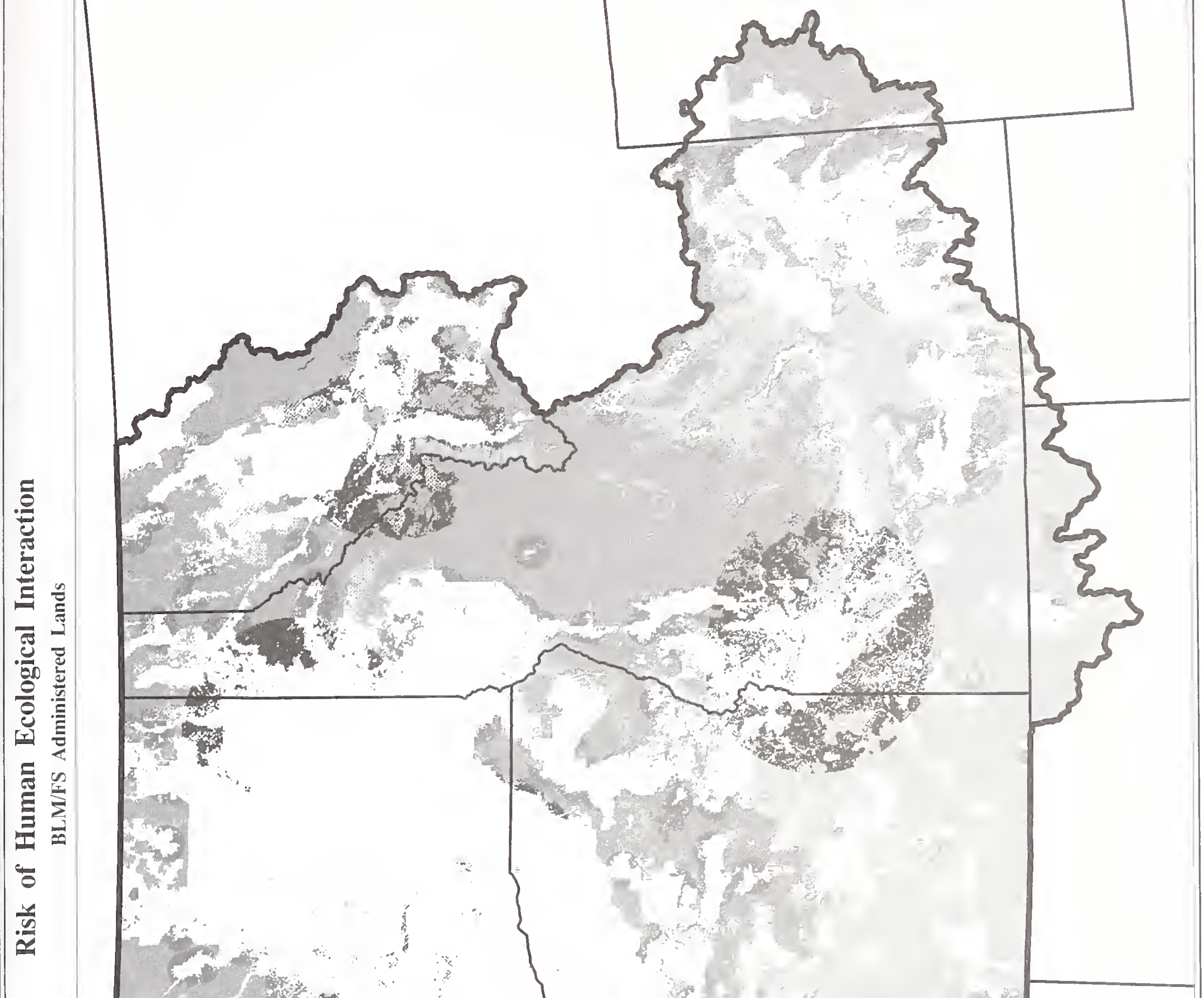


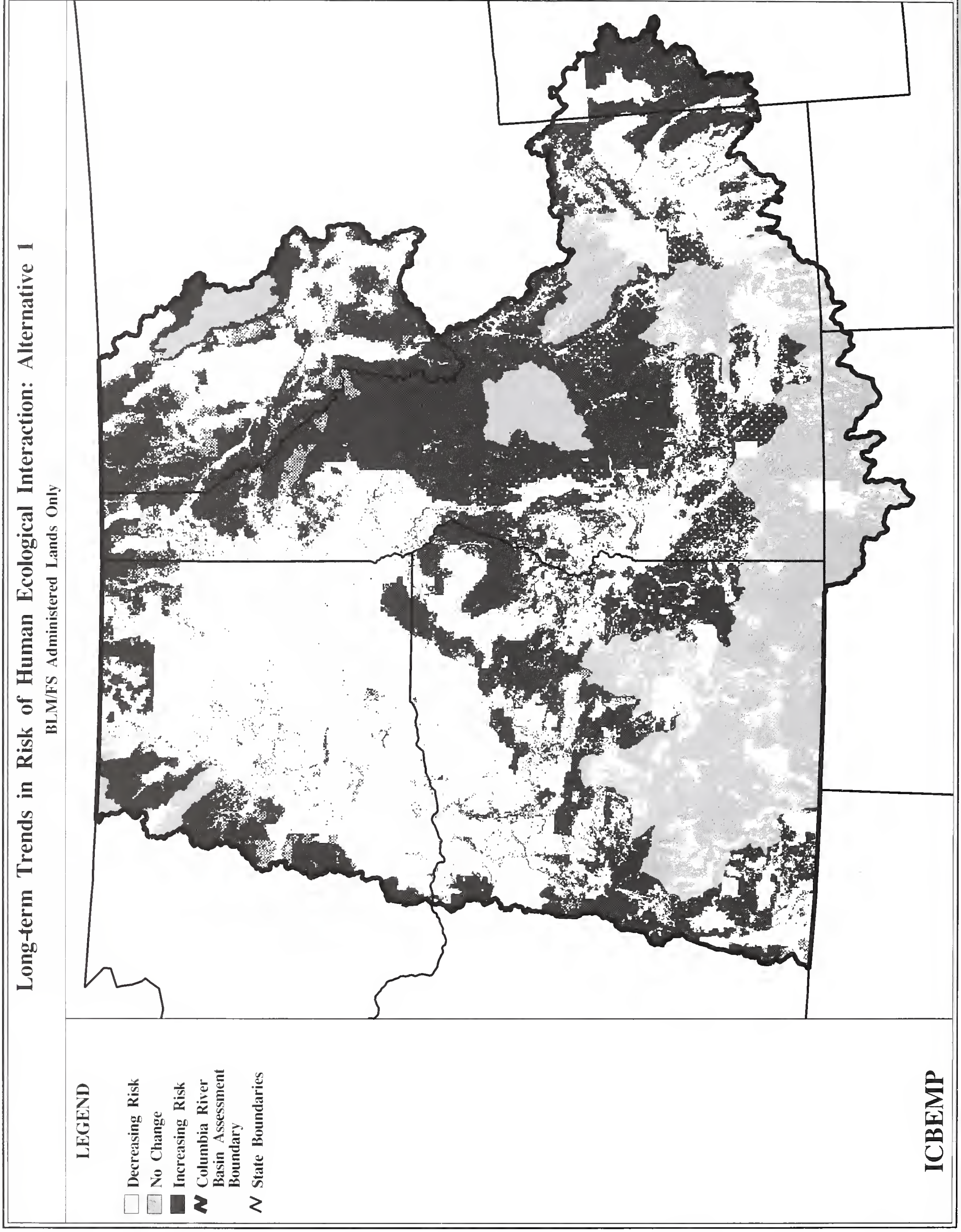
Figure 7.7 – Trends in risk to human assets and ecological integrity projected for each alternative for FS- and BLM-administered lands.



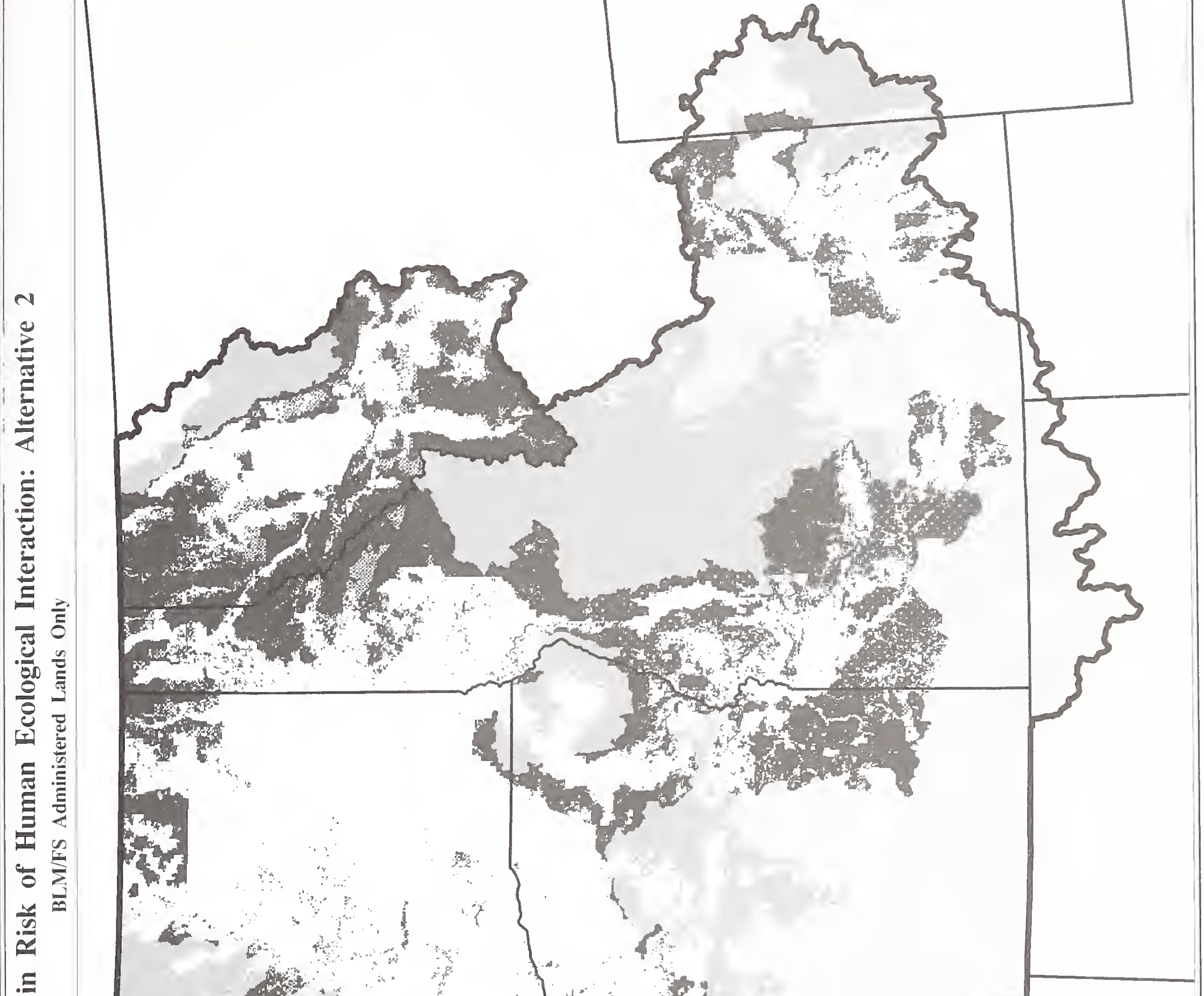
Map 7.10 – Level of societal risk associated with interactions of human and ecological systems.



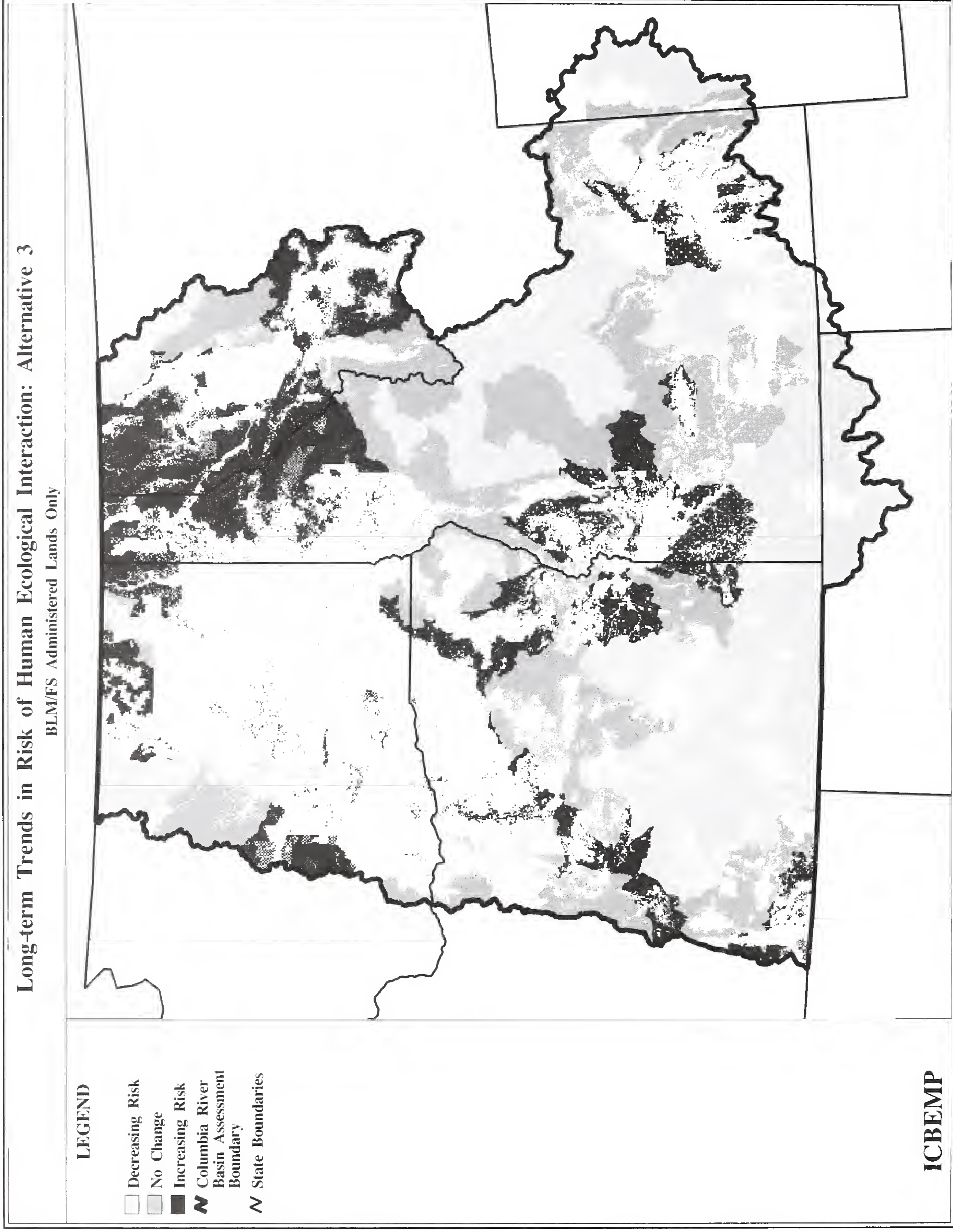
Map 7.11 – Level of risk associated with the management of human ecological interactions on FS- and BLM-administered lands.



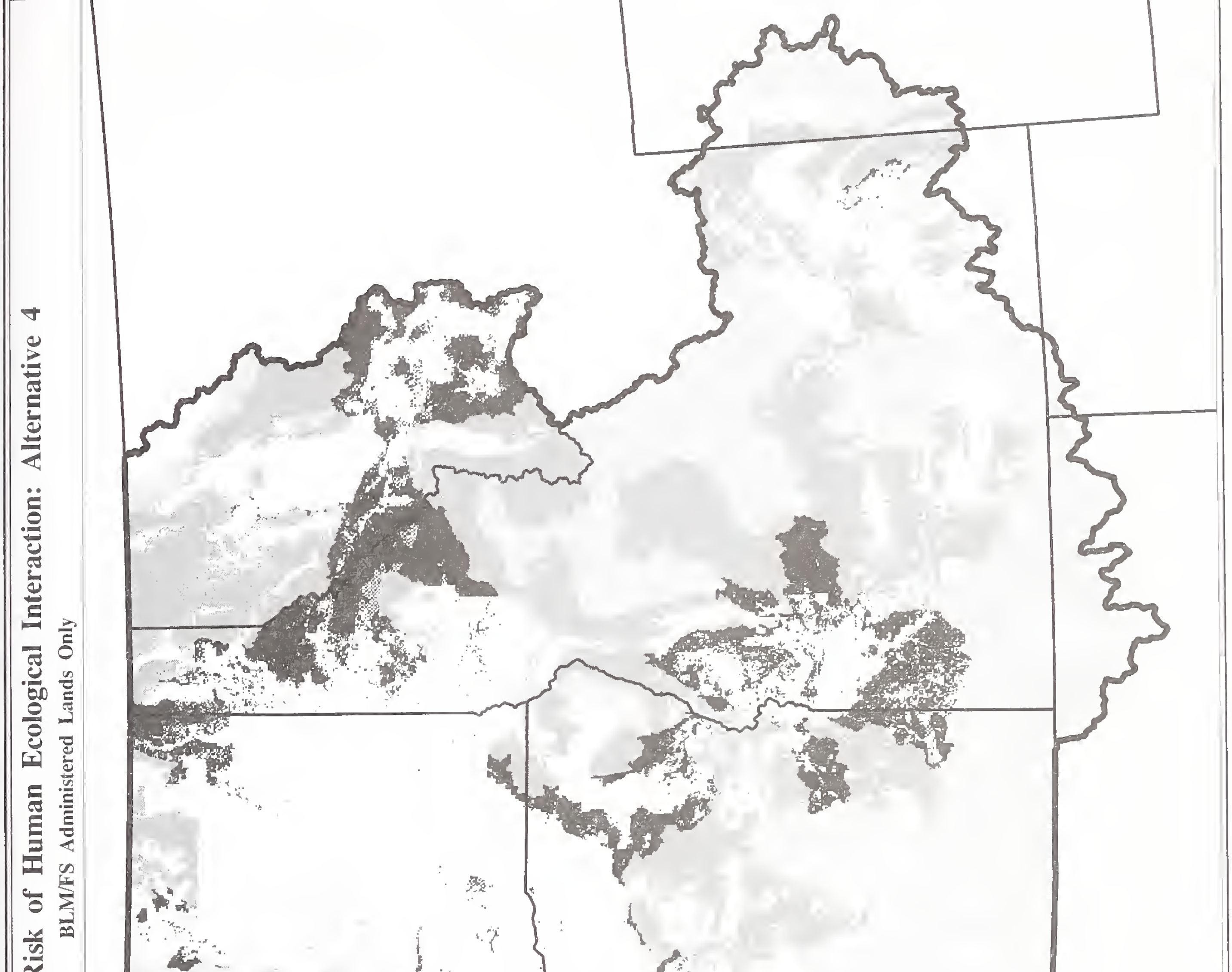
Map 7.12 – Long-term trends in risk of human ecological interaction on FS- and BLM-administered lands only: Alternative 1.



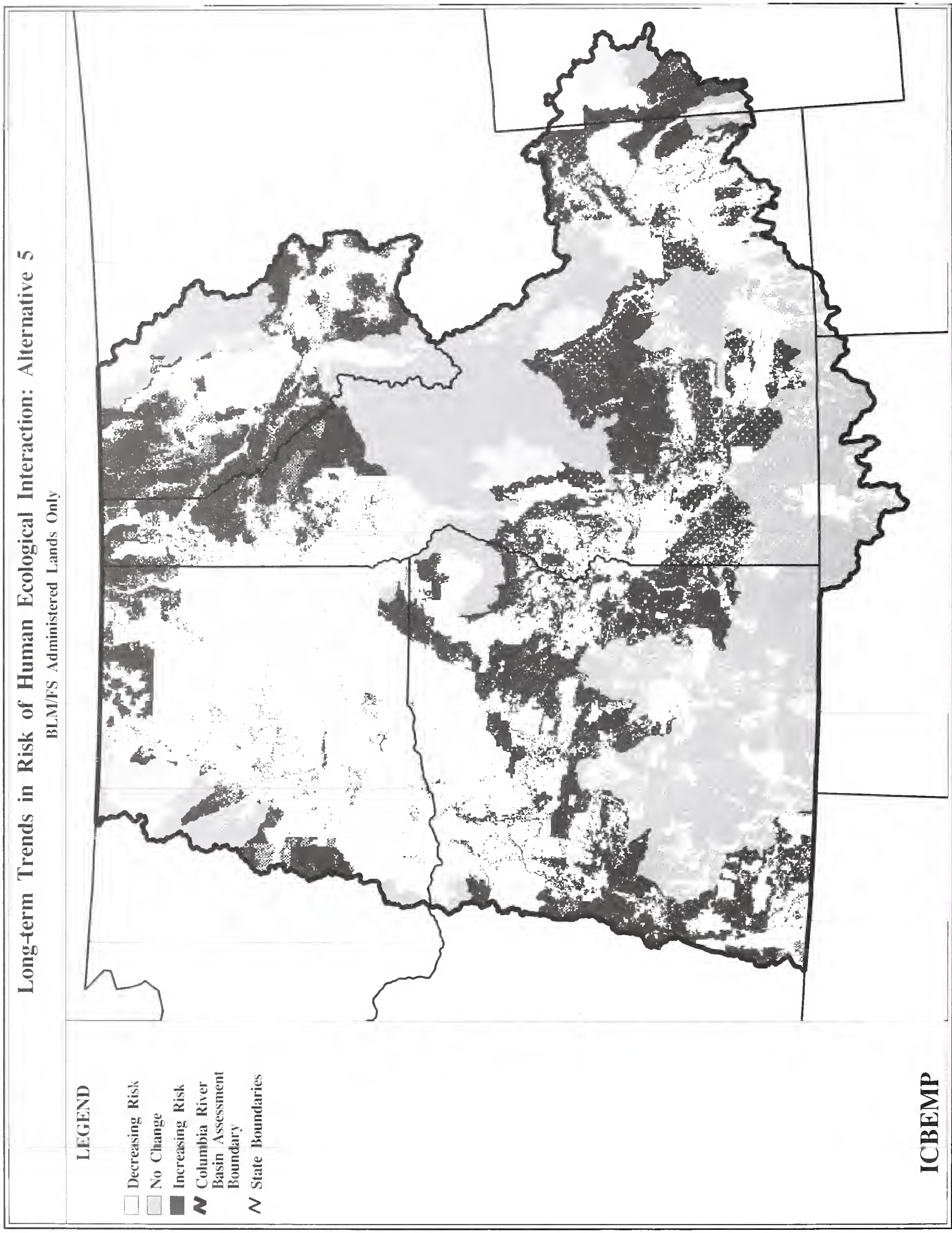
Map 7.13 – Long-term trends in risk of human ecological interaction on FS- and BLM-administered lands only: Alternative 2.



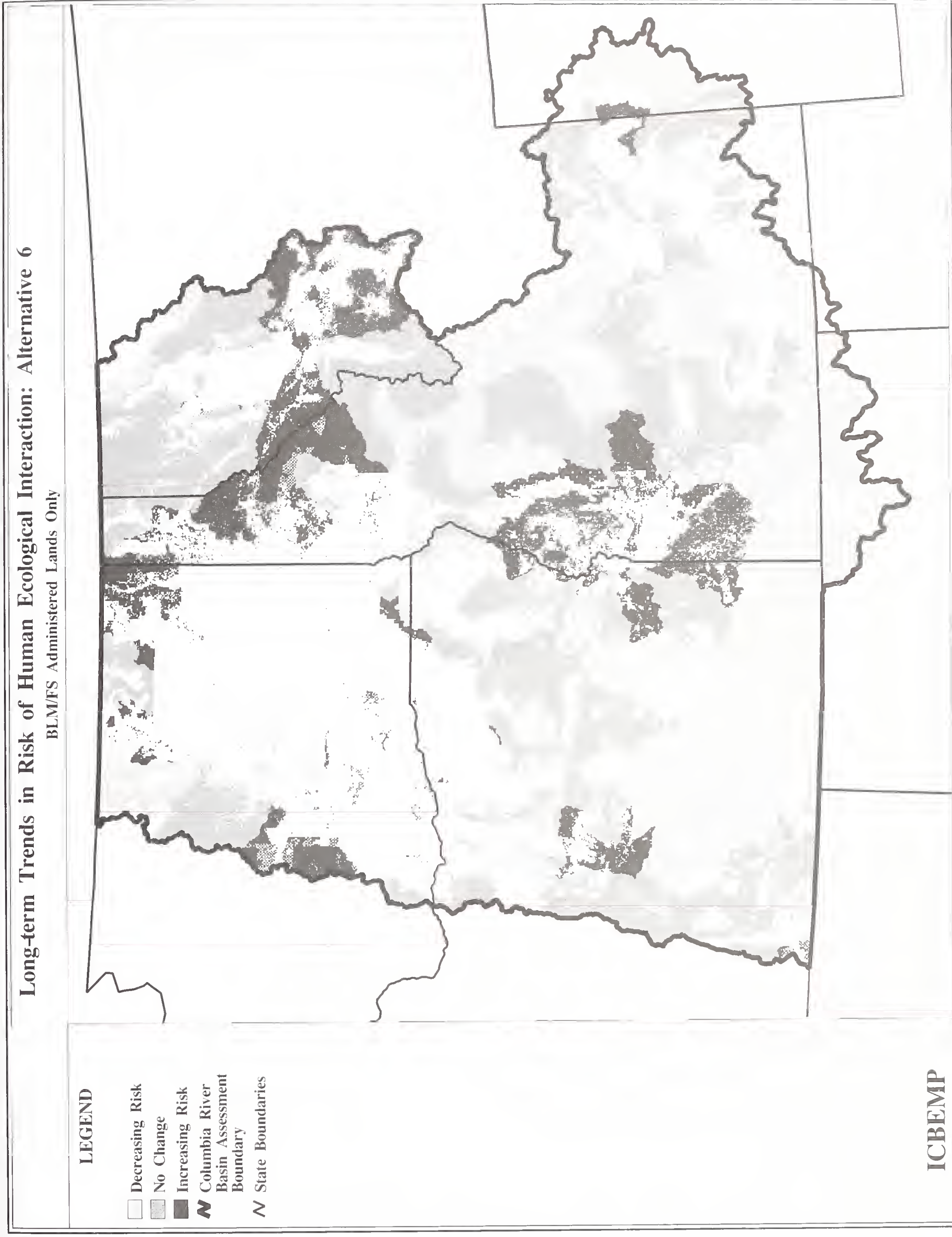
Map 7.14 – Long-term trends in risk of human ecological interaction on FS- and BLM-administered lands only: Alternative 3.



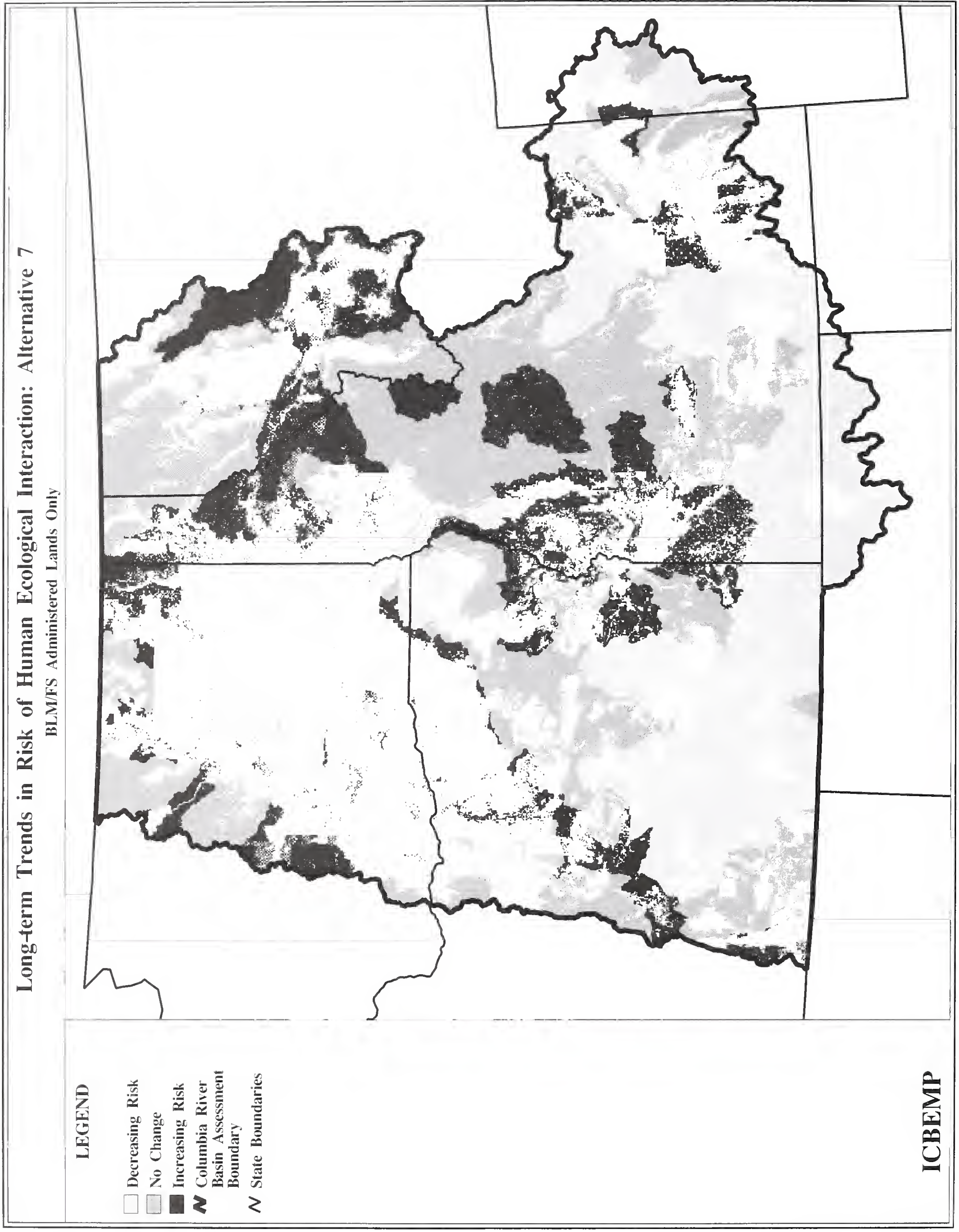
Map 7.15 – Long-term trends in risk of human ecological interaction on FS- and BLM-administered lands only: Alternative 4.



Map 7.16 – Long-term trends in risk of human ecological interaction on FS- and BLM-administered lands only: Alternative 5.



Map 7.17 – Long-term trends in risk of human ecological interaction on FS- and BLM-administered lands only: Alternative 6.



Map 7.18 – Long-term trends in risk of human ecological interaction on FS- and BLM-administered lands only: Alternative 7.

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Appendix 7-A

Table 7A.1 – Integrity ratings for each subbasin within the Interior Columbia Basin Project area.

Subbasin		Cluster #		Integrity Ratings					
ID#	Name	Forest	Range	Forest	Range	Aquatic	Hydrology (Forest)	Hydrology (Range)	Composite Ecological
1	Alvord Lake		5		M	M		L	M
2	American Falls		6		L	L			L
3	Banks Lake		4		L	L		M	L
4	Beaver-Camas	6	6	M	L	L	L	H	L
5	Beaver-South Fork		1		L	L		H	L
6	Big Lost	6	5	H	M	L	H	L	L
7	Big Wood	6	6	H	M	M	M	H	L
8	Birch		5		M	L		M	M
9	Bitterroot	3	3	M		M	M		M
10	Blackfoot	3	3	M		M	L		M
11	Blackfoot		6		L	M			L
12	Boise-Mores	5	3	L		L	M		L
13	Brownlee Reservoir	6	5	M	M	L	L	L	L
14	Bruneau		5		M	M		M	M
15	Bully		6		L	L		H	L
16	Burnt	5	6	L	L	L	L	H	L
17	Butte	5	3	L		L	H		L
18	C. J. Strike Reservoir		6		L	L		M	L
19	Camas		6		M	L	L	H	L
20	Chief Joseph	6	4	M	L	L	L	M	L
21	Clearwater	3	3	L		M	L		M
22	Coeur d'Alene Lake	4		L		L	M		L
23	Colville	6	3	L		L	L		L
24	Crooked-Rattlesnake		6		M	L		L	M
25	Donner Und Blitzen		5		L	M		L	M
26	East Little Owyhee		5		H	L		L	M
27	Fisher	4		L		L	M		L
28	Flathead Lake	4	3	L		L	M		L
29	Flint-Rock	2	3	M		H	M		H
30	Franklin D. Roosevelt Lake	6	3	L		L	L		L
31	Goose		5		L	L		L	M
32	Goose Lake	5	1	L	L	M	L		L
33	Greys-Hobock	1	5	H	H	H	H		H
34	Gros Ventre	1	3	H		H	H		H
35	Guano		6		M	M		H	M
36	Hangman	6	3	L		L	L		L
37	Harney-Malheur Lakes		6		L	L		H	L
38	Hells Canyon	2	2	M	M	H	H	L	M
39	Idaho Falls		6		L	L			L
40	Imnaha	2	5	M	L	H	H	L	H
41	Jordan		6		L	L		L	M
42	Kettle	4	3	L		L	L		L
43	Klickitat	3	3	L		H	M		M
44	Lake Abert	5	6	M	L	L	H		L
45	Lake Chelan	1	2	H		M	H		H
46	Lake Walcott		6		L	L		H	L

Table 7A.1 (continued)

Subbasin		Cluster #		Integrity Ratings					
ID#	Name	Forest	Range	Forest	Range	Aquatic	Hydrology (Forest)	Hydrology (Range)	Composite Ecological
47	Lemhi	2	5	H	M	M	M	L	H
48	Little Deschutes	5	3	L		L	M		L
49	Little Lost		5		H	M		L	M
50	Little Salmon	3	3	L		M	M		M
51	Little Spokane	6	3	L		L	L		L
52	Little Wood		6		L	L		H	L
53	Lochsa	2		L		M	H		H
54	Lost	5	1	L	L	L	L	M	L
55	Lower Boise		6		L	L		H	L
56	Lower Clark Fork	4		L		L	H		L
57	Lower Crab		4		L	L		H	L
58	Lower Crooked	6	1	L	L	L	M	M	L
59	Lower Deschutes	5	1	L	L	M	M	L	L
60	Lower Flathead	6	3	L		L	L		L
61	Lower Grande Ronde	5	6	L	L	H	L	M	M
62	Lower Henrys	6	6	H	L	L	L		L
63	Lower John Day		1		L	M		M	L
64	Lower Kootenai	4		L		L	M		L
65	Lower Malheur		6		L	L		H	L
66	Lower Middle Fork Salmon	1	2	H		H	H		H
67	Lower North Fork Clearwater	4	3	L		M	M		L
68	Lower Owyhee		6		M	L		M	M
69	Lower Salmon	3	3	L		M	L		M
70	Lower Selway	2	2	M		M	H		H
71	Lower Snake		4		L	L		M	L
72	Lower Snake-Asotin	3	4	L	L	L	L	L	M
73	Lower Snake-Tucannon		4		L	L		M	L
74	Lower Spokane	6	3	L		L	L		L
75	Lower Yakima		4		L	L		M	L
76	Medicine Lodge	6	6	H	M	L	L	H	L
77	Methow	2	2	M		M	M		H
78	Middle Clark Fork	4		L		M	M		L
79	Middle Columbia-Hood	3	3	L		M	L		M
80	Middle Columbia-Lake Wallula		4		L	L		M	L
81	Middle Fork Clearwater	3	3	L		M	L		M
82	Middle Fork Flathead	1		H		M	H		H
83	Middle Fork John Day	5	6	L	L	M	M	M	L
84	Middle Fork Payette	6	3	L		L	M		L
85	Middle Owyhee		5		M	M		L	M
86	Middle Salmon-Chamberlain	2	2	H		H	H		H
87	Middle Salmon-Panther	2	5	H	M	M	H	L	H
88	Middle Snake-Payette		6		L	L		H	L
89	Middle Snake-Succor		5		L	L		M	M
90	Moses Coulee		4		L	L		M	L
91	Moyie	4		L		L	H		L
92	Naches	2	2	M		H	H		H
93	North And Middle Fork Boise	2	3	H		M	M		H
94	North Fork Flathead	1		H		M	H		H
95	North Fork John Day	5	3	L		M	M		L
96	North Fork Payette	6	3	L		L	L		L
97	Okanogan	6	4	L	L	L	L	L	L

Table 7A.1 (continued)

	Subbasin	Cluster #		Integrity Ratings					
ID#	Name	Forest	Range	Forest	Range	Aquatic	Hydrology (Forest)	Hydrology (Range)	Composite Ecological
98	Pahsimeroi	2	5	H	H	M	H	L	H
99	Palisades	2	5	H	H	M	H		H
100	Palouse	4		L	L		M	L	
101	Payette	6	6	L	L	L	L	H	L
102	Pend Oreille	4		L		L	L		L
103	Pend Oreille Lake	4	3	L		M	H		L
104	Portneuf		6		L	M			L
105	Powder	5	3	L		L	L		L
106	Priest	4		L		L	M		L
107	Raft		6		L	L		M	L
108	Rock		4		L	L		H	L-NoOwn
109	Salmon Falls		5		M	L		L	M
110	Salt	6	3	H		M	M		L
111	Sanpoil	4	3	L		L	L		L
112	Silver		6		L	L		H	L
113	Silvies	5	6	L	L	L	M	H	L
114	Similkameen	1	2	H		L	M		H
115	Snake Headwaters	1	2	H		H	H		H
116	South Fork Boise	2	5	M	L	M	M	L	H
117	South Fork Clearwater	3	3	L		M	M		M
118	South Fork Coeur d'Alene	4		L		L	L		L
119	South Fork Flathead	1	2	H		H	H		H
120	South Fork Owyhee		5		H	L		L	M
121	South Fork Payette	2	3	H		M	H		H
122	South Fork Salmon	2	3	H		M	H		H
123	Sprague	5	3	L		M	H		L
124	St. Joe	4		L		M	H		L
125	Stillwater	4		L		L	M		L
126	Summer Lake	5	6	M	L	L	H		L
127	Swan	3		L		M	H		M
128	Teton	6	6	M	L	M	L		L
129	Thousand-Virgin		5		M	M		H	M
130	Trout		1		L	M		H	L
131	Umatilla	5	4	L	L	M	L	M	L
132	Upper Clark Fork	5	3	L		L	L		L
133	Upper Coeur d'Alene	4		L		M	H		L
134	Upper Columbia-Entiat	4	5	M	L	L	M	L	M
135	Upper Columbia-Priest Rapids		4		L	L		M	L
136	Upper Crab		4		L	L		M	L
137	Upper Crooked	5	1	L	L	L	L	H	L
138	Upper Deschutes	4	3	L		L	H		M
139	Upper Grande Ronde	5	3	L		M	L		L
140	Upper Henrys	4	6	H	M	M	M		M
141	Upper John Day	5	1	L	L	M	M	M	L
142	Upper Klamath	5	3	L		L	H		L
143	Upper Klamath Lake	3	3	M		L	M		L
144	Upper Kootenai	4		L		M	M		L
145	Upper Malheur	5	6	M	L	L	M	M	L
146	Upper Middle Fork Salmon	1		H		H	H		H
147	Upper North Fork Clearwater	4		M		M	M		L
148	Upper Owyhee		5		H	M		M	M

Table 7A.1 (continued)

Subbasin		Cluster #		Integrity Ratings					
ID#	Name	Forest	Range	Forest	Range	Aquatic	Hydrology (Forest)	Hydrology (Range)	Composite Ecological
149	Upper Quinn		5		M	L		L	M
150	Upper Salmon	1	5	H	M	M	H	L	H
151	Upper Selway	2	2	H		H	H		H
152	Upper Snake-Rock		6		L	L		H	L
153	Upper Spokane	6	3	L		L	L		L
154	Upper Yakima	3	5	L	L	M	M	L	M
155	Walla Walla		4		L	M	L	M	L
156	Wallowa	2	2	L		H	L		H
157	Warner Lakes		6		M	L		H	M
158	Weiser	6	6	L	L	L	L	H	L
159	Wenatchee	2	2	M		H	H		H
160	Williamson	5	3	L		M	M		L
161	Willow	5	6	L	L	M	M		L
162	Willow		6		L	L		H	L
163	Willow		4		L	L		M	L
164	Yaak	4		L		M	H		L

H = High integrity rating
M = medium integrity rating
L = low integrity rating
NoOwn = no BLM/FS ownership in subbasin
1,2,3,4,5,6 indicate forest or rangeland cluster numbers

Table 7A.2 – Social and economic resiliency ratings for each county within the Interior Columbia Basin Project area.

County	State	Typology	Economic Resiliency	Social Resiliency	Lifestyle Diversity	Socioeconomic Resiliency
Ada	ID	Metropolitan	H	H	H	H
Adams	WA	Other	L	L	M	L
Adams	ID	Other	L	L	L	L
Asotin	WA	Other	M	M	H	H
Baker	OR	Other	M	M	H	M
Bannock	ID	Other	M	M	H	H
Benewah	ID	Recreation	L	L	M	L
Benton	WA	Metropolitan	M	M	H	H
Bingham	ID	Other	L	L	H	M
Blaine	ID	Recreation	M	M	M	L
Boise	ID	Other	L	L	M	L
Bonner	ID	Recreation	H	H	H	H
Bonneville	ID	Other	M	M	H	H
Boundary	ID	Other	M	M	L	L
Box Elder	UT	Other	L	L	L	L
Butte	ID	Other	L	L	L	L
Camas	ID	Recreation	L	L	L	L
Canyon	ID	Metropolitan	H	H	H	H
Caribou	ID	Other	L	L	L	L
Cassia	ID	Other	M	M	M	M
Chelan	WA	Recreation	H	H	H	H
Clark	ID	Other	L	L	L	L
Clearwater	ID	Other	L	L	M	L
Columbia	WA	Other	L	L	L	L
Crook	OR	Other	L	L	H	L
Custer	ID	Recreation	L	L	L	L
Deer Lodge	MT	Other	L	L	M	M
Deschutes	OR	Recreation	H	H	H	H
Douglas	WA	Other	L	L	H	M
Elko	NV	Recreation	L	L	L	L
Elmore	ID	Other	L	L	M	L
Ferry	WA	Other	L	L	M	L
Flathead	MT	Recreation	H	H	H	H
Franklin	WA	Metropolitan	M	M	H	H
Fremont	WY	Recreation	M	M	L	L
Fremont	ID	Other	L	L	M	L
Garfield	WA	Other	L	L	L	L
Gem	ID	Other	M	M	M	M
Gilliam	OR	Other	L	L	L	L
Gooding	ID	Other	M	M	L	M
Granite	MT	Other	L	L	L	L
Grant	OR	Other	L	L	M	L
Grant	WA	Other	M	M	M	M
Harney	OR	Other	L	L	M	L
Hood River	OR	Recreation	H	H	M	H
Humboldt	NV	Recreation	L	L	L	L
Idaho	ID	Other	M	M	M	L
Jefferson	ID	Other	L	L	M	M
Jefferson	OR	Other	M	M	M	M
Jerome	ID	Other	M	M	M	M

Table 7A.2 (continued)

County	State	Typology	Economic Resiliency	Social Resiliency	Lifestyle Diversity	Socioeconomic Resiliency
Kittitas	WA	Other	L	L	H	M
Klamath	OR	Other	H	M	H	H
Klickitat	WA	Other	L	L	H	M
Kootenai	ID	Recreation	H	H	H	H
Lake	OR	Other	L	L	M	L
Lake	MT	Other	M	M	M	M
Latah	ID	Other	L	L	M	M
Lemhi	ID	Recreation	M	M	L	L
Lewis	ID	Other	L	L	L	L
Lewis and Clark	MT	Recreation	M	M	H	H
Lincoln	ID	Other	L	L	L	L
Lincoln	MT	Other	M	M	M	L
Lincoln	WY	Other	M	M	L	L
Lincoln	WA	Other	L	L	L	L
Madison	ID	Other	L	M	L	M
Malheur	OR	Other	L	L	M	L
Mineral	MT	Other	L	L	L	L
Minidoka	ID	Other	L	L	M	M
Missoula	MT	Other	H	H	H	H
Morrow	OR	Other	L	L	L	L
Nez Perce	ID	Other	H	H	H	H
Okanogan	WA	Recreation	L	L	M	L
Oneida	ID	Other	L	L	L	L
Owyhee	ID	Other	L	L	L	L
Payette	ID	Other	M	M	M	H
Pend Oreille	WA	Other	M	M	L	L
Powell	MT	Other	L	L	M	L
Power	ID	Other	L	L	L	L
Ravalli	MT	Other	L	L	M	M
Sanders	MT	Other	M	M	L	L
Sherman	OR	Other	L	L	L	L
Shoshone	ID	Other	L	L	L	L
Silver Bow	MT	Other	L	M	H	H
Skamania	WA	Other	L	L	M	L
Spokane	WA	Metropolitan	H	H	H	H
Stevens	WA	Other	H	H	M	H
Sublette	WY	Recreation	M	M	L	L
Teton	ID	Recreation	L	L	L	L
Teton	WY	Recreation	L	L	L	L
Twin Falls	ID	Other	H	H	H	H
Umatilla	OR	Other	H	H	H	H
Union	OR	Other	M	M	H	H
Valley	ID	Recreation	M	M	L	L
Walla Walla	WA	Other	H	H	H	H
Wallowa	OR	Other	M	M	L	L
Wasco	OR	Recreation	M	M	H	M
Washington	ID	Other	M	M	L	L
Wheeler	OR	Other	L	L	L	L
Whitman	WA	Other	L	L	M	M
Yakima	WA	Metropolitan	H	H	H	H

H = high resiliency rating
M = medium resiliency rating
L = low resiliency rating

Table 7A.3 – Long-term trends in ecological integrity projected for each subbasin within the Interior Columbia Basin Ecosystem Management Project area.

Subbasin		Alternative 1				Alternative 2				Alternative 3				Alternative 4			
ID #	Name	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp
1	Alvord Lake	-1	-1	0	-2	0	1	0	1	1	1	0	2	1	1	0	2
2	American Falls	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
3	Banks Lake	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
4	Beaver-Camas	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
5	Beaver-South Fork	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
6	Big Lost	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
7	Big Wood	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
8	Birch	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
9	Bitterroot	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
10	Blackfoot	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
11	Blackfoot	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0
12	Boise-Mores	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
13	Brownlee Reservoir	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
14	Bruneau	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
15	Bully	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
16	Burnt	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
17	Butte	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
18	C. J. Strike Reservoir	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
19	Camas	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
20	Chief Joseph	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
21	Clearwater	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
22	Coeur D'Alene Lake	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
23	Colville	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
24	Crooked-Rattlesnake	-1	-1	0	-2	-1	1	0	0	0	1	0	1	1	1	0	2
25	Donner Und Blitzen	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
26	East Little Owyhee	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
27	Fisher	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
28	Flathead Lake	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
29	Flint-Rock	-1	-1	-1	-3	0	1	0	1	1	1	1	3	1	1	1	3
30	Franklin D. Roosevelt Lake	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
31	Goose	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
32	Goose Lake	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
33	Greys-Hobock	-1	-1	0	-2	0	1	0	1	1	1	0	2	1	1	0	2
34	Gros Ventre	0	-1	0	-1	0	1	0	1	1	1	0	2	1	1	0	2
35	Guano	-1	-1	0	-2	-1	1	0	0	0	1	0	1	1	1	0	2
36	Hangman	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
37	Harney-Malheur Lakes	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
38	Hells Canyon	-1	0	-1	-2	0	0	0	0	1	0	0	1	1	0	0	1
39	Idaho Falls	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
40	Imnaha	-1	-1	-1	-3	0	1	0	1	1	1	1	3	1	1	1	3
41	Jordan	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1

Table 7A.3 (continued)

Subbasin ID #	Name	Alternative 1 Veg	Rip	Road	Comp	Alternative 2 Veg	Rip	Road	Comp	Alternative 3 Veg	Rip	Road	Comp	Alternative 4 Veg	Rip	Road	Comp
42	Kettle	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
43	Klickitat	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
44	Lake Abert	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
45	Lake Chelan	0	1	0	1	0	1	0	1	1	1	0	2	1	1	0	2
46	Lake Walcott	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
47	Lemhi	-1	-1	-1	-3	-1	1	0	0	1	1	0	2	1	1	0	2
48	Little Deschutes	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
49	Little Lost	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
50	Little Salmon	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
51	Little Spokane	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
52	Little Wood	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
53	Lochsa	-1	-1	-1	-3	0	1	0	1	1	1	1	3	1	1	1	3
54	Lost	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
55	Lower Boise	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
56	Lower Clark Fork	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
57	Lower Crab	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
58	Lower Crooked	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
59	Lower Deschutes	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
60	Lower Flathead	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
61	Lower Grande Ronde	-1	-1	-1	-3	-1	1	1	1	1	1	-1	1	1	1	-1	1
62	Lower Henrys	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
63	Lower John Day	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0
64	Lower Kootenai	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
65	Lower Malheur	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
66	Lower Middle Fork Salmon	0	0	0	0	1	0	0	1	1	0	0	1	1	0	0	1
67	Lower North Fork Clearwater	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
68	Lower Owyhee	-1	-1	0	-2	-1	1	0	0	0	1	0	1	1	1	0	2
69	Lower Salmon	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
70	Lower Selway	-1	0	-1	-2	0	0	0	0	1	0	1	2	1	0	1	2
71	Lower Snake	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
72	Lower Snake-Asotin	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
73	Lower Snake-Tucannon	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0
74	Lower Spokane	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
75	Lower Yakima	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
76	Medicine Lodge	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
77	Methow	-1	1	-1	-1	0	1	0	1	1	1	1	3	1	1	1	3
78	Middle Clark Fork	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
79	Middle Columbia-Hood	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
80	Middle Columbia-Lake Wallula	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0
81	Middle Fork Clearwater	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
82	Middle Fork Flathead	0	-1	0	-1	0	1	0	1	1	1	0	2	1	1	0	2
83	Middle Fork John Day	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
84	Middle Fork Payette	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
85	Middle Owyhee	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2

Table 7A.3 (continued)

Subbasin		Alternative 1				Alternative 2				Alternative 3				Alternative 4			
ID #	Name	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp
86	Middle Salmon-Chamberlain	0	0	-1	-1	0	0	0	0	1	0	1	2	1	0	1	2
87	Middle Salmon-Panther	-1	-1	-1	-3	-1	1	0	0	1	1	0	2	1	1	0	2
88	Middle Snake-Payette	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
89	Middle Snake-Succor	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
90	Moses Coulee	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
91	Moyie	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
92	Naches	-1	-1	-1	-3	0	1	0	1	1	1	1	3	1	1	1	3
93	North And Middle Fork Boise	-1	-1	-1	-3	0	1	0	1	1	1	1	3	1	1	1	3
94	North Fork Flathead	0	-1	0	-1	0	1	0	1	1	1	0	2	1	1	0	2
95	North Fork John Day	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
96	North Fork Payette	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
97	Okanogan	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
98	Pahsimeroi	-1	-1	-1	-3	0	1	0	1	1	1	0	2	1	1	0	2
99	Palisades	-1	-1	-1	-3	0	1	0	1	1	1	0	2	1	1	0	2
100	Palouse	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0
101	Payette	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
102	Pend Oreille	-1	-1	-1	-3	-1	1	-1	-1	0	1	-1	0	0	1	-1	0
103	Pend Oreille Lake	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
104	Portneuf	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
105	Powder	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
106	Priest	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
107	Raft	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
108	Rock	0	0	0	NA	0	0	0	NA	0	0	0	NA	0	0	0	NA
109	Salmon Falls	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
110	Salt	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
111	Sanpoil	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
112	Silver	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
113	Silvies	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
114	Similkameen	0	1	0	1	0	1	0	1	1	1	0	2	1	1	0	2
115	Snake Headwaters	0	-1	0	-1	1	1	0	2	1	1	0	2	1	1	0	2
116	South Fork Boise	-1	-1	-1	-3	-1	1	0	0	1	1	1	3	1	1	1	3
117	South Fork Clearwater	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
118	South Fork Coeur D'Alene	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
119	South Fork Flathead	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1
120	South Fork Owyhee	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
121	South Fork Payette	-1	-1	-1	-3	0	1	0	1	1	1	0	2	1	1	1	3
122	South Fork Salmon	-1	-1	-1	-3	0	1	0	1	1	1	0	2	1	1	0	2
123	Sprague	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
124	St. Joe	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
125	Stillwater	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
126	Summer Lake	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
127	Swan	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
128	Teton	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
129	Thousand-Virgin	-1	0	0	-1	0	0	0	0	1	0	0	1	1	0	0	1
130	Trout	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0

Table 7A.3 (continued)

Subbasin		Alternative 1				Alternative 2				Alternative 3				Alternative 4			
ID #	Name	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp
131	Umatilla	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
132	Upper Clark Fork	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
133	Upper Coeur D'Alene	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
134	Upper Columbia-Entiat	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
135	Upper Columbia-Priest Rapids	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
136	Upper Crab	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
137	Upper Crooked	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
138	Upper Deschutes	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
139	Upper Grande Ronde	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
140	Upper Henrys	-1	-1	-1	-3	-1	1	-1	-1	0	1	-1	0	1	1	-1	1
141	Upper John Day	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
142	Upper Klamath	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
143	Upper Klamath Lake	-1	-1	-1	-3	-1	1	-1	-1	0	1	-1	0	0	1	-1	0
144	Upper Kootenai	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
145	Upper Malheur	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
146	Upper Middle Fork Salmon	0	0	0	0	1	0	0	1	1	0	0	1	1	0	0	1
147	Upper North Fork Clearwater	-1	-1	-1	-3	-1	1	-1	-1	0	1	-1	0	0	1	-1	0
148	Upper Owyhee	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
149	Upper Quinn	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
150	Upper Salmon	-1	-1	0	-2	0	1	0	1	1	1	0	2	1	1	0	2
151	Upper Selway	0	0	-1	-1	1	0	0	1	1	0	0	1	1	0	0	1
152	Upper Snake-Rock	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
153	Upper Spokane	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
154	Upper Yakima	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
155	Walla Walla	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0
156	Wallowa	0	-1	-1	-2	1	1	0	2	1	1	0	2	1	1	0	2
157	Warner Lakes	-1	-1	0	-2	-1	1	0	0	0	1	0	1	1	1	0	2
158	Weiser	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
159	Wenatchee	-1	-1	-1	-3	0	1	0	1	1	1	1	3	1	1	1	3
160	Williamson	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
161	Willow	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
163	Willow	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0
162	Willow	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
164	Yaak	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0

Veg = Forest/Range Vegetation
Rip = Riparian Management
Road = Road Density
Comp = Composite Ecological Integrity
Values assigned reflect either decreasing (-1), stable (0), or increasing (+1) trends for each index.

Table 7A.4 – Long term trends in ecological integrity projected for each subbasin within the Interior Columbia Basin Ecosystem Management Project area.

	Subbasin	Alternative 5				Alternative 6				Alternative 7			
ID #	Name	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp
1	Alvord Lake	-1	-1	0	-2	0	1	0	1	0	1	0	1
2	American Falls	-1	-1	0	-2	0	1	0	1	-1	1	0	0
3	Banks Lake	-1	1	0	0	0	1	0	1	0	1	0	1
4	Beaver-Camas	-1	-1	-1	-3	0	1	0	1	-1	1	0	0
5	Beaver-South Fork	-1	-1	0	-2	0	1	0	1	0	1	0	1
6	Big Lost	-1	-1	-1	-3	-1	1	0	0	-1	1	0	0
7	Big Wood	0	-1	-1	-2	0	1	0	1	-1	1	0	0
8	Birch	-1	-1	0	-2	-1	1	0	0	0	1	0	1
9	Bitterroot	1	1	-1	1	1	1	1	3	1	1	1	3
10	Blackfoot	1	1	-1	1	1	1	1	3	-1	1	1	1
11	Blackfoot	-1	-1	0	-2	-1	1	0	0	-1	1	0	0
12	Boise-Mores	0	-1	-1	-2	0	1	0	1	0	1	0	1
13	Brownlee Reservoir	-1	-1	-1	-3	-1	1	0	0	-1	1	0	0
14	Bruneau	-1	-1	0	-2	-1	1	0	0	0	1	0	1
15	Bully	-1	-1	0	-2	0	1	0	1	-1	1	0	0
16	Burnt	0	-1	-1	-2	0	1	0	1	0	1	0	1
17	Butte	0	-1	0	-1	0	1	0	1	0	1	0	1
18	C. J. Strike Reservoir	0	-1	0	-1	0	1	0	1	0	1	0	1
19	Camas	-1	-1	0	-2	0	1	0	1	-1	1	0	0
20	Chief Joseph	-1	1	-1	-1	0	1	0	1	-1	1	0	0
21	Clearwater	1	1	-1	1	1	1	1	3	1	1	1	3
22	Coeur D'Alene Lake	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
23	Colville	-1	1	-1	-1	-1	1	0	0	-1	1	0	0
24	Crooked-Rattlesnake	0	-1	0	-1	1	1	0	2	1	1	0	2
25	Donner Und Blitzen	-1	-1	0	-2	0	1	0	1	0	1	0	1
26	East Little Owyhee	-1	-1	0	-2	-1	1	0	0	0	1	0	1
27	Fisher	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
28	Flathead Lake	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
29	Flint-Rock	1	1	0	2	1	1	1	3	0	1	1	2
30	Franklin D. Roosevelt Lake	0	1	-1	0	-1	1	0	0	-1	1	0	0
31	Goose	-1	-1	0	-2	-1	1	0	0	-1	1	0	0
32	Goose Lake	0	-1	-1	-2	0	1	0	1	-1	1	0	0
33	Greys-Hobock	0	-1	0	-1	1	1	0	2	1	1	0	2
34	Gros Ventre	0	1	0	1	1	1	0	2	0	1	0	1
35	Guano	0	-1	0	-1	1	1	0	2	-1	1	0	0
36	Hangman	0	1	0	1	0	1	0	1	-1	1	0	0
37	Harney-Malheur Lakes	-1	-1	0	-2	0	1	0	1	0	1	0	1
38	Hells Canyon	1	0	0	1	1	0	0	1	-1	0	0	-1
39	Idaho Falls	-1	-1	0	-2	0	1	0	1	0	1	0	1
40	Imnaha	1	-1	0	0	1	1	1	3	-1	1	1	1
41	Jordan	-1	-1	0	-2	0	1	0	1	0	1	0	1
42	Kettle	-1	-1	-1	-3	0	1	-1	0	0	1	0	1

Table 7A.4 (continued)

ID #	Subbasin Name	Alternative 5 Veg	Rip	Road	Comp	Alternative 6 Veg	Rip	Road	Comp	Alternative 7 Veg	Rip	Road	Comp
43	Klickitat	1	1	-1	1	1	1	1	3	0	1	1	2
44	Lake Abert	0	-1	-1	-2	0	1	0	1	0	1	0	1
45	Lake Chelan	0	1	0	1	1	1	0	2	-1	1	0	0
46	Lake Walcott	0	-1	0	-1	0	1	0	1	-1	1	0	0
47	Lemhi	1	-1	0	0	1	1	0	2	0	1	0	1
48	Little Deschutes	0	-1	-1	-2	0	1	0	1	-1	1	0	0
49	Little Lost	-1	-1	0	-2	-1	1	0	0	-1	1	0	0
50	Little Salmon	1	1	-1	1	1	1	1	3	1	1	1	3
51	Little Spokane	-1	1	-1	-1	0	1	0	1	-1	1	0	0
52	Little Wood	-1	-1	0	-2	0	1	0	1	-1	1	0	0
53	Lochsa	1	1	0	2	1	1	1	3	-1	1	1	1
54	Lost	0	-1	-1	-2	0	1	0	1	0	1	0	1
55	Lower Boise	0	-1	0	-1	0	1	0	1	-1	1	0	0
56	Lower Clark Fork	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
57	Lower Crab	-1	1	0	0	0	1	0	1	0	1	0	1
58	Lower Crooked	-1	-1	-1	-3	0	1	0	1	-1	1	0	0
59	Lower Deschutes	0	-1	-1	-2	0	1	0	1	-1	1	0	0
60	Lower Flathead	-1	1	-1	-1	0	1	0	1	-1	1	0	0
61	Lower Grande Ronde	1	-1	-1	-1	1	1	1	3	1	1	1	3
62	Lower Henrys	0	-1	-1	-2	0	1	0	1	-1	1	0	0
63	Lower John Day	-1	-1	0	-2	0	1	0	1	-1	1	0	0
64	Lower Kootenai	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
65	Lower Malheur	0	-1	0	-1	0	1	0	1	0	1	0	1
66	Lower Middle Fork Salmon	1	0	0	1	1	0	0	1	-1	0	0	-1
67	Lower North Fork Clearwater	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
68	Lower Owyhee	0	-1	0	-1	1	1	0	2	1	1	0	2
69	Lower Salmon	1	1	-1	1	1	1	1	3	1	1	1	3
70	Lower Selway	1	0	0	1	1	0	1	2	-1	0	1	0
71	Lower Snake	-1	1	0	0	0	1	0	1	0	1	0	1
72	Lower Snake-Asotin	1	1	-1	1	1	1	1	3	1	1	1	3
73	Lower Snake-Tucannon	-1	1	0	0	-1	1	0	0	-1	1	0	0
74	Lower Spokane	-1	1	0	0	0	1	0	1	-1	1	0	0
75	Lower Yakima	-1	1	0	0	0	1	0	1	-1	1	0	0
76	Medicine Lodge	0	-1	-1	-2	0	1	0	1	-1	1	0	0
77	Methow	1	1	0	2	1	1	1	3	-1	1	1	1
78	Middle Clark Fork	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
79	Middle Columbia-Hood	1	1	-1	1	1	1	1	3	-1	1	1	1
80	Middle Columbia-Lake Wallula	-1	1	0	0	-1	1	0	0	-1	1	0	0
81	Middle Fork Clearwater	1	1	-1	1	1	1	1	3	1	1	1	3
82	Middle Fork Flathead	0	1	0	1	1	1	0	2	-1	1	0	0
83	Middle Fork John Day	0	-1	-1	-2	0	1	0	1	-1	1	0	0
84	Middle Fork Payette	-1	1	-1	-1	-1	1	0	0	-1	1	0	0
85	Middle Owyhee	-1	-1	0	-2	0	1	0	1	-1	1	0	0
86	Middle Salmon-Chamberlain	1	0	0	1	1	0	1	2	-1	0	1	0

Table 7A.4 (continued)

Subbasin		Alternative 5				Alternative 6				Alternative 7			
ID #	Name	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp
87	Middle Salmon-Panther	1	-1	0	0	1	1	0	2	0	1	0	1
88	Middle Snake-Payette	0	-1	0	-1	0	1	0	1	0	1	0	1
89	Middle Snake-Succor	-1	-1	0	-2	-1	1	0	0	-1	1	0	0
90	Moses Coulee	-1	1	0	0	0	1	0	1	-1	1	0	0
91	Moyie	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
92	Naches	1	1	0	2	1	1	1	3	-1	1	1	1
93	North And Middle Fork Boise	1	1	0	2	1	1	1	3	0	1	1	2
94	North Fork Flathead	-1	1	0	0	1	1	0	2	0	1	0	1
95	North Fork John Day	0	-1	-1	-2	0	1	0	1	-1	1	0	0
96	North Fork Payette	0	1	-1	0	-1	1	0	0	-1	1	0	0
97	Okanogan	-1	1	-1	-1	0	1	0	1	-1	1	0	0
98	Pahsimeroi	1	-1	0	0	1	1	0	2	0	1	0	1
99	Palisades	1	-1	0	0	1	1	0	2	1	1	0	2
100	Palouse	-1	1	0	0	-1	1	0	0	-1	1	0	0
101	Payette	-1	-1	-1	-3	0	1	0	1	-1	1	0	0
102	Pend Oreille	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
103	Pend Oreille Lake	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
104	Portneuf	-1	-1	0	-2	0	1	0	1	-1	1	0	0
105	Powder	0	-1	-1	-2	0	1	0	1	-1	1	0	0
106	Priest	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
107	Raft	-1	-1	0	-2	0	1	0	1	0	1	0	1
108	Rock	0	0	0	NA	0	0	0	NA	0	0	0	NA
109	Salmon Falls	-1	-1	0	-2	-1	1	0	0	0	1	0	1
110	Salt	0	1	-1	0	-1	1	0	0	-1	1	0	0
111	Sanpoil	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
112	Silver	-1	-1	0	-2	0	1	0	1	0	1	0	1
113	Silvies	0	-1	-1	-2	0	1	0	1	0	1	0	1
114	Similkameen	0	1	0	1	1	1	0	2	0	1	0	1
115	Snake Headwaters	1	1	0	2	1	1	0	2	1	1	0	2
116	South Fork Boise	1	-1	0	0	1	1	1	3	0	1	1	2
117	South Fork Clearwater	1	1	-1	1	1	1	1	3	1	1	1	3
118	South Fork Coeur D'Alene	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
119	South Fork Flathead	0	0	0	0	1	0	0	1	-1	0	0	-1
120	South Fork Owyhee	-1	-1	0	-2	-1	1	0	0	-1	1	0	0
121	South Fork Payette	1	1	0	2	1	1	0	2	0	1	1	2
122	South Fork Salmon	1	1	0	2	1	1	0	2	0	1	0	1
123	Sprague	0	-1	-1	-2	0	1	0	1	0	1	0	1
124	St. Joe	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
125	Stillwater	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
126	Summer Lake	0	-1	-1	-2	0	1	0	1	0	1	0	1
127	Swan	1	1	-1	1	1	1	1	3	-1	1	1	1
128	Teton	0	-1	-1	-2	-1	1	0	0	-1	1	0	0
129	Thousand-Virgin	0	0	0	0	0	0	0	0	-1	0	0	-1
130	Trout	-1	-1	0	-2	-1	1	0	0	0	1	0	1
131	Umatilla	0	-1	-1	-2	0	1	0	1	-1	1	0	0

Table 7A.4 (continued)

ID #	Subbasin Name	Alternative 5 Veg	Rip	Road	Comp	Alternative 6 Veg	Rip	Road	Comp	Alternative 7 Veg	Rip	Road	Comp
132	Upper Clark Fork	0	-1	-1	-2	0	1	0	1	0	1	0	1
133	Upper Coeur D'Alene	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
134	Upper Columbia-Entiat	-1	-1	-1	-3	1	1	-1	1	-1	1	1	1
135	Upper Columbia-Priest Rapids	-1	1	0	0	0	1	0	1	-1	1	0	0
136	Upper Crab	-1	1	0	0	0	1	0	1	0	1	0	1
137	Upper Crooked	0	-1	-1	-2	0	1	0	1	0	1	0	1
138	Upper Deschutes	0	-1	-1	-2	1	1	-1	1	-1	1	1	1
139	Upper Grande Ronde	0	-1	-1	-2	0	1	0	1	0	1	0	1
140	Upper Henrys	0	-1	-1	-2	1	1	-1	1	1	1	1	3
141	Upper John Day	0	-1	-1	-2	0	1	0	1	0	1	0	1
142	Upper Klamath	0	-1	-1	-2	0	1	0	1	0	1	0	1
143	Upper Klamath Lake	0	1	-1	0	0	1	0	1	-1	1	0	0
144	Upper Kootenai	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
145	Upper Malheur	0	-1	-1	-2	0	1	0	1	0	1	0	1
146	Upper Middle Fork Salmon	0	0	0	0	1	0	0	1	-1	0	0	-1
147	Upper North Fork Clearwater	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
148	Upper Owyhee	-1	-1	0	-2	-1	1	0	0	0	1	0	1
149	Upper Quinn	-1	-1	0	-2	-1	1	0	0	0	1	0	1
150	Upper Salmon	0	-1	0	-1	1	1	0	2	-1	1	0	0
151	Upper Selway	1	0	0	1	1	0	0	1	-1	0	0	-1
152	Upper Snake-Rock	0	-1	0	-1	0	1	0	1	0	1	0	1
153	Upper Spokane	-1	1	0	0	0	1	0	1	-1	1	0	0
154	Upper Yakima	1	-1	-1	-1	1	1	1	3	-1	1	1	1
155	Walla Walla	-1	1	0	0	-1	1	0	0	-1	1	0	0
156	Wallowa	1	1	0	2	1	1	0	2	1	1	0	2
157	Warner Lakes	0	-1	0	-1	1	1	0	2	-1	1	0	0
158	Weiser	-1	-1	-1	-3	0	1	0	1	-1	1	0	0
159	Wenatchee	1	1	0	2	1	1	1	3	-1	1	1	1
160	Williamson	0	-1	-1	-2	0	1	0	1	0	1	0	1
161	Willow	0	-1	-1	-2	0	1	0	1	0	1	0	1
163	Willow	-1	1	0	0	-1	1	0	0	-1	1	0	0
162	Willow	-1	-1	0	-2	0	1	0	1	0	1	0	1
164	Yaak	-1	-1	-1	-3	0	1	-1	0	0	1	0	1

Veg = Forest/Range Vegetation
Rip = Riparian Management
Road = Road Density
Comp = Composite Ecological Integrity

Values assigned reflect either decreasing (-1), stable (0), or increasing (+1) trends for each index.

Table 7A.5 – Longterm trends in risks to ecological integrity by alternative.

Subbasin ID#	Name	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1	Alvord Lake	0	-1	-1	-1	0	-1	-1
2	American Falls	+1	+1	+1	0	+1	0	+1
3	Banks Lake	+1	+1	+1	0	+1	0	0
4	Beaver-Camas	+1	+1	0	0	+1	0	+1
5	Beaver-South Fork	0	-1	-1	-1	0	-1	-1
6	Big Lost	+1	0	0	0	+1	0	0
7	Big Wood	+1	0	0	0	+1	0	0
8	Birch	0	-1	-1	-1	0	-1	-1
9	Bitterroot	+1	+1	0	0	0	0	0
10	Blackfoot	+1	+1	+1	+1	+1	+1	+1
11	Blackfoot	+1	0	0	0	+1	0	0
12	Boise-Mores	+1	+1	+1	+1	+1	+1	+1
13	Brownlee Reservoir	+1	+1	0	0	+1	+1	+1
14	Bruneau	0	-1	-1	-1	0	-1	-1
15	Bully	+1	+1	+1	0	+1	0	+1
16	Burnt	+1	0	0	0	+1	0	0
17	Butte	+1	+1	+1	+1	+1	+1	+1
18	C. J. Strike Reservoir	+1	+1	0	0	+1	0	0
19	Camas	+1	+1	+1	0	+1	0	+1
20	Chief Joseph	+1	+1	0	0	+1	0	+1
21	Clearwater	+1	+1	+1	+1	+1	+1	+1
22	Coeur D'Alene Lake	+1	+1	+1	+1	+1	+1	+1
23	Colville	+1	+1	+1	+1	+1	+1	+1
24	Crooked-Rattlesnake	0	-1	-1	-1	0	-1	-1
25	Donner Und Blitzen	0	-1	-1	-1	0	-1	-1
26	East Little Owyhee	0	-1	-1	-1	0	-1	-1
27	Fisher	+1	+1	+1	0	+1	0	0
28	Flathead Lake	+1	+1	+1	0	+1	0	0
29	Flint-Rock	+1	+1	+1	+1	+1	+1	+1
30	Franklin D. Roosevelt Lake	+1	+1	0	0	+1	+1	+1
31	Goose	0	-1	-1	-1	0	-1	-1
32	Goose Lake	+1	0	0	0	+1	0	0
33	Greys-Hobock	+1	0	-1	-1	+1	-1	-1
34	Gros Ventre	+1	0	-1	-1	0	-1	0
35	Guano	0	-1	-1	-1	0	-1	-1
36	Hangman	+1	+1	+1	+1	+1	+1	+1
37	Harney-Malheur Lakes	0	-1	-1	-1	0	-1	-1
38	Hells Canyon	+1	0	0	0	0	0	+1
39	Idaho Falls	+1	+1	+1	0	+1	0	0
40	Imnaha	+1	0	-1	-1	0	-1	0
41	Jordan	+1	+1	+1	+1	+1	+1	+1
42	Kettle	+1	+1	+1	0	+1	0	0
43	Klickitat	+1	+1	+1	+1	+1	+1	+1
44	Lake Abert	0	-1	-1	-1	0	-1	-1
45	Lake Chelan	0	0	0	0	0	0	+1
46	Lake Walcott	0	-1	-1	-1	0	-1	-1
47	Lemhi	+1	0	-1	-1	0	-1	0
48	Little Deschutes	+1	+1	+1	+1	+1	0	+1
49	Little Lost	0	-1	-1	-1	0	-1	-1
50	Little Salmon	+1	+1	0	0	0	-1	-1
51	Little Spokane	+1	+1	+1	+1	+1	+1	+1

Table 7A.5 (continued)

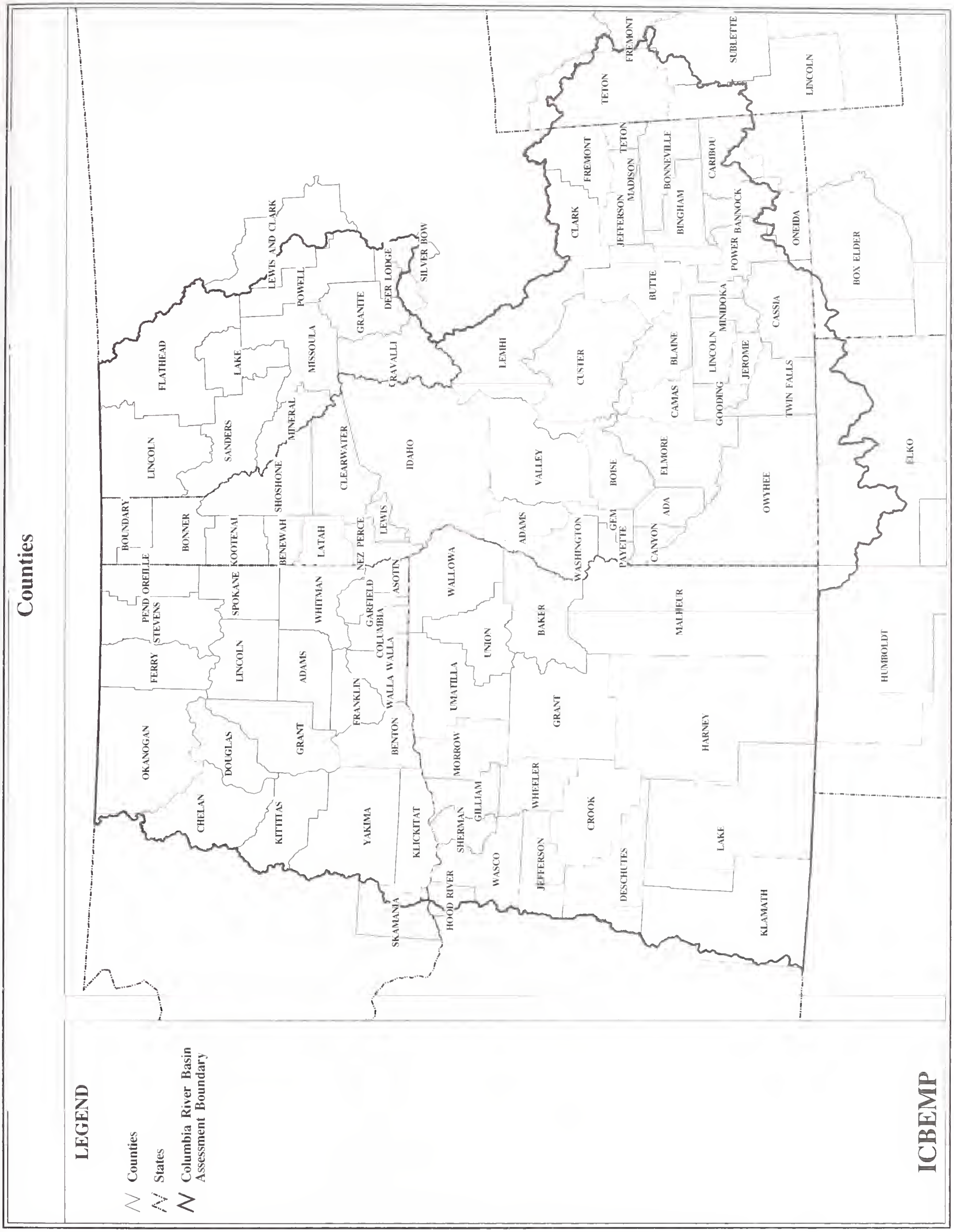
Subbasin ID#	Name	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
52	Little Wood	0	-1	-1	-1	0	-1	-1
53	Lochsa	+1	0	0	0	0	0	0
54	Lost	+1	+1	+1	+1	+1	0	0
55	Lower Boise	+1	+1	+1	+1	+1	+1	+1
56	Lower Clark Fork	+1	+1	+1	0	+1	0	0
57	Lower Crab	+1	+1	+1	0	+1	0	0
58	Lower Crooked	+1	+1	+1	+1	+1	+1	+1
59	Lower Deschutes	+1	0	0	0	+1	0	0
60	Lower Flathead	+1	+1	+1	+1	+1	+1	+1
61	Lower Grande Ronde	+1	0	0	0	+1	-1	-1
62	Lower Henrys	+1	0	0	0	+1	0	0
63	Lower John Day	+1	+1	+1	+1	+1	0	+1
64	Lower Kootenai	+1	+1	+1	0	+1	0	0
65	Lower Malheur	+1	+1	+1	+1	+1	+1	+1
66	Lower Middle Fork Salmon	0	0	0	0	0	0	+1
67	Lower North Fork Clearwater	+1	+1	+1	0	+1	0	0
68	Lower Owyhee	+1	+1	0	0	+1	0	0
69	Lower Salmon	+1	+1	0	0	0	0	0
70	Lower Selway	+1	0	-1	-1	0	-1	0
71	Lower Snake	+1	+1	+1	+1	+1	+1	+1
72	Lower Snake-Asotin	+1	+1	0	0	0	0	0
73	Lower Snake-Tucannon	+1	+1	+1	+1	+1	+1	+1
74	Lower Spokane	+1	+1	+1	+1	+1	+1	+1
75	Lower Yakima	+1	+1	+1	+1	+1	+1	+1
76	Medicine Lodge	0	-1	-1	-1	0	-1	-1
77	Methow	+1	0	-1	-1	-1	-1	0
78	Middle Clark Fork	+1	+1	+1	+1	+1	+1	+1
79	Middle Columbia-Hood	+1	+1	0	0	0	0	0
80	Middle Columbia-Lake Wallula	+1	+1	+1	+1	+1	+1	+1
81	Middle Fork Clearwater	+1	+1	0	0	0	-1	-1
82	Middle Fork Flathead	+1	0	-1	-1	0	-1	0
83	Middle Fork John Day	+1	0	0	0	+1	0	0
84	Middle Fork Payette	+1	+1	+1	+1	+1	+1	+1
85	Middle Owyhee	0	-1	-1	-1	0	-1	-1
86	Middle Salmon-Chamberlain	+1	0	-1	-1	0	-1	0
87	Middle Salmon-Panther	+1	0	-1	-1	0	-1	0
88	Middle Snake-Payette	+1	+1	+1	+1	+1	+1	+1
89	Middle Snake-Succor	+1	+1	+1	+1	+1	+1	+1
90	Moses Coulee	+1	+1	0	0	+1	0	+1
91	Moyie	+1	+1	+1	0	+1	0	0
92	Naches	+1	+1	+1	+1	+1	+1	+1
93	North And Middle Fork Boise	+1	+1	+1	+1	+1	+1	+1
94	North Fork Flathead	+1	0	-1	-1	0	-1	0
95	North Fork John Day	+1	0	0	0	+1	0	0
96	North Fork Payette	+1	+1	0	0	+1	+1	+1
97	Okanogan	+1	+1	+1	+1	+1	+1	+1
98	Pahsimeroi	0	-1	-1	-1	-1	-1	-1
99	Palisades	+1	0	0	0	+1	0	0
100	Palouse	+1	+1	+1	+1	+1	+1	+1
101	Payette	+1	+1	+1	+1	+1	+1	+1
102	Pend Oreille	+1	+1	+1	+1	+1	+1	+1
103	Pend Oreille Lake	+1	+1	+1	+1	+1	+1	+1
104	Portneuf	+1	+1	+1	0	+1	0	+1

Table 7A.5 (continued)

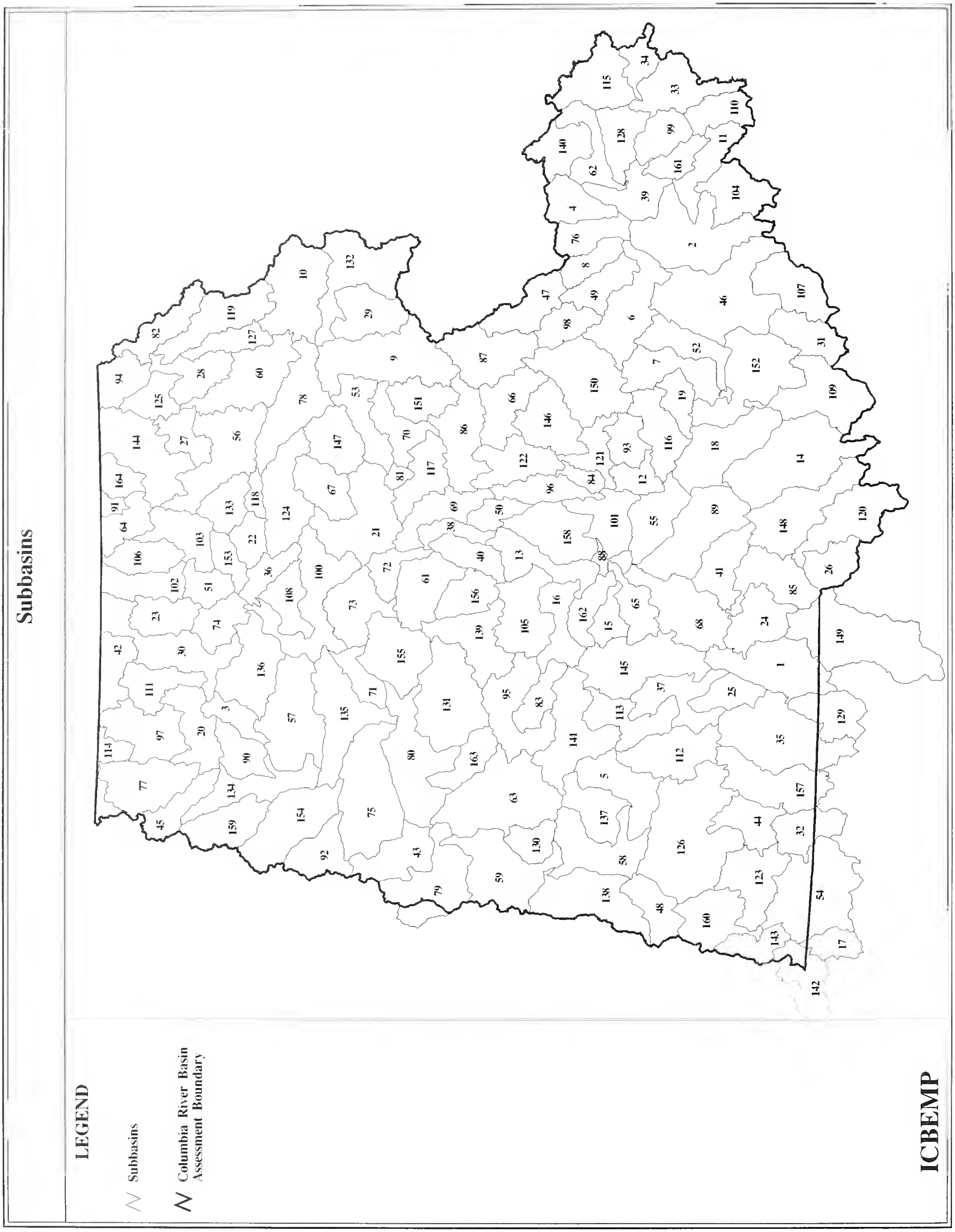
Subbasin ID#	Name	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
105	Powder	+1	+1	+1	+1	+1	0	+1
106	Priest	+1	+1	+1	+1	+1	+1	+1
107	Raft	0	-1	-1	-1	0	-1	-1
108	Rock				NA			
109	Salmon Falls	0	-1	-1	-1	0	-1	-1
110	Salt	+1	0	0	0	0	0	0
111	Sanpoil	+1	+1	+1	0	+1	0	0
112	Silver	0	-1	-1	-1	0	-1	-1
113	Silvies	+1	0	0	0	+1	0	0
114	Similkameen	0	0	-1	-1	0	-1	0
115	Snake Headwaters	+1	-1	-1	-1	-1	-1	-1
116	South Fork Boise	+1	+1	0	0	+1	0	0
117	South Fork Clearwater	+1	+1	0	0	0	0	0
118	South Fork Coeur D'Alene	+1	+1	+1	+1	+1	+1	+1
119	South Fork Flathead	0	0	0	0	0	0	+1
120	South Fork Owyhee	0	-1	-1	-1	0	-1	-1
121	South Fork Payette	+1	0	0	0	0	0	0
122	South Fork Salmon	+1	0	-1	-1	-1	-1	0
123	Sprague	+1	0	0	0	+1	0	0
124	St. Joe	+1	+1	+1	+1	+1	+1	+1
125	Stillwater	+1	+1	+1	0	+1	0	0
126	Summer Lake	0	-1	-1	-1	0	-1	-1
127	Swan	+1	+1	0	0	0	0	0
128	Teton	+1	+1	0	0	+1	+1	+1
129	Thousand-Virgin	0	-1	-1	-1	-1	-1	0
130	Trout	+1	0	0	0	+1	0	0
131	Umatilla	+1	+1	+1	+1	+1	0	+1
132	Upper Clark Fork	+1	+1	+1	+1	+1	+1	+1
133	Upper Coeur D'Alene	+1	+1	+1	+1	+1	+1	+1
134	Upper Columbia-Entiat	+1	+1	0	0	+1	0	0
135	Upper Columbia-Priest Rapids	+1	+1	+1	+1	+1	+1	+1
136	Upper Crab	+1	+1	+1	0	+1	0	0
137	Upper Crooked	+1	0	0	0	+1	0	0
138	Upper Deschutes	+1	+1	0	0	+1	0	0
139	Upper Grande Ronde	+1	+1	+1	+1	+1	0	0
140	Upper Henrys	+1	+1	0	0	+1	0	-1
141	Upper John Day	+1	0	0	0	+1	0	0
142	Upper Klamath	+1	+1	+1	+1	+1	+1	+1
143	Upper Klamath Lake	+1	+1	+1	+1	+1	0	+1
144	Upper Kootenai	+1	+1	+1	0	+1	0	0
145	Upper Malheur	0	-1	-1	-1	0	-1	-1
146	Upper Middle Fork Salmon	0	0	0	0	0	0	+1
147	Upper North Fork Clearwater	+1	+1	+1	+1	+1	+1	+1
148	Upper Owyhee	0	-1	-1	-1	0	-1	-1
149	Upper Quinn	0	-1	-1	-1	0	-1	-1
150	Upper Salmon	+1	0	-1	-1	+1	-1	0
151	Upper Selway	+1	0	0	0	0	0	+1
152	Upper Snake-Rock	+1	+1	0	0	+1	0	0
153	Upper Spokane	+1	+1	+1	+1	+1	+1	+1
154	Upper Yakima	+1	+1	+1	+1	+1	+1	+1
155	Walla Walla	+1	+1	+1	+1	+1	+1	+1
156	Wallowa	+1	0	0	0	0	0	0
157	Warner Lakes	0	-1	-1	-1	0	-1	-1

Table 7A.5 (continued)

Subbasin ID#	Name	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
158	Weiser	+1	+1	+1	+1	+1	+1	+1
159	Wenatchee	+1	0	0	0	0	0	0
160	Williamson	+1	0	0	0	+1	0	0
161	Willow	+1	+1	+1	+1	+1	0	0
163	Willow	+1	+1	+1	+1	+1	+1	+1
162	Willow	+1	+1	+1	0	+1	0	0
164	Yaak	+1	+1	+1	0	+1	0	0



Map 7A.1 – Counties within the Basin.



Map 7A.2 – Distribution of subbasins by identification number as referenced in tables 7A.1, 7A.3, 7A.4, and 7A.5.

CHAPTER 8

February 1996 and February 1997 EIS Versions: Changes in Effects

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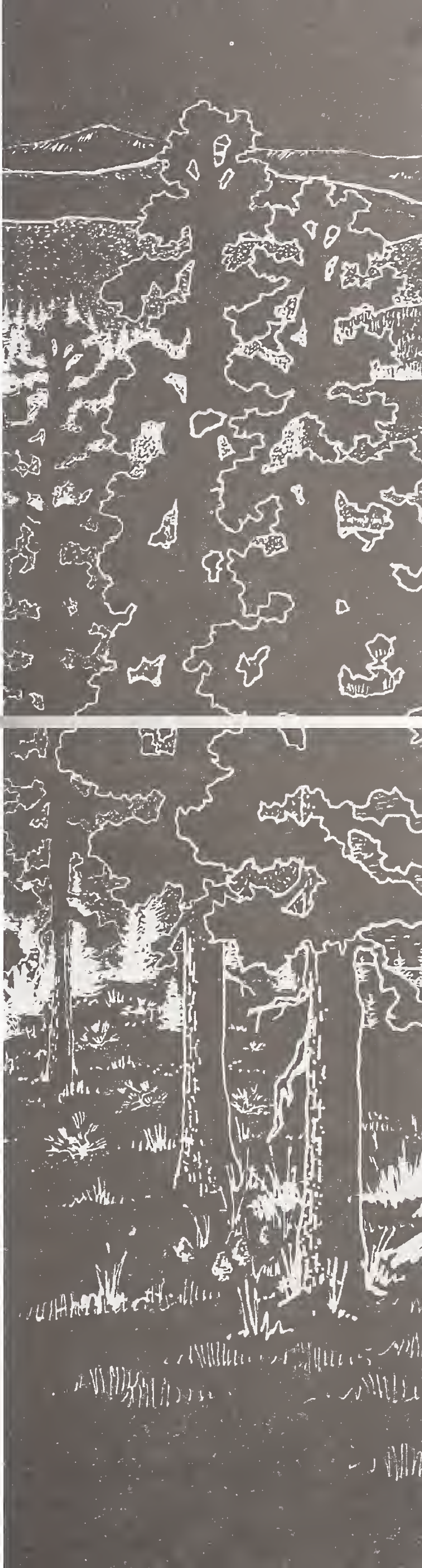
Technical Editor



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Introduction

The EIS Teams provided the Science Integration Team (SIT) with preliminary Draft Environmental Impact Statements (DEISs) in October 1995 containing chapters on the purpose and need, affected environment, and objectives and standards of alternatives for initial evaluation of effects and consequences. This version of the DEISs did not contain enough detail to make a complete evaluation of effects and consequences. The SIT provided a preliminary analysis of effects to the EIS Teams. In February 1996 the EIS Teams provided an updated version of the preliminary DEISs for evaluation of alternatives by the SIT. Interactions with public groups, other agencies, county and state officials and internal Forest Service and Bureau of Land Management staff continued during the period of alternative development. This resulted in continued evolution of the EIS standards and objectives. The February 1996 preliminary DEISs were the versions on which the SIT focused its analysis of consequences and effects. This publication documents the analysis of the February 1996 version. Nearing completion of the DEISs in February 1997, the EIS Team provided updated versions of the DEISs for final review by the SIT before publication in May 1997. Because of the fluid nature of the alternatives, it is essential to refer directly to the DEISs to obtain an understanding of the alternatives as they are being proposed.

The changes in the DEISs from February 1996 to February 1997 primarily clarify or define processes to be implemented, define completion schedules for standards, tie standards more clearly to objectives, or define desired ecological outcomes. For instance, ecological performance measures or quantifiable ecological goals were added to all alternatives. All alternatives continue to describe the analysis required to modify non-process EIS standards, while providing equal or greater assurance of meeting objectives. The purpose of this chapter is to provide a brief description of the evolution in the EIS and some insight into the changes in effects and consequences that have resulted. The organization of the chapter is by SIT staff area.

Within each section, changes to the DEIS are discussed in terms of how they affect outcomes and consequences related to the effects the SIT staff areas reported for the February 1996 preliminary draft EISs. The type of effect is described, but no attempt is made here to describe in complete detail all the associated effects or consequences likely from implementing the revised DEIS alternatives. The SIT worked closely with the EIS team as they documented effects and consequences within the DEIS itself. For an enumeration and discussion of effects refer directly to the revised DEISs.

Landscape Ecology

Wendel J. Hann, Rebecca A. Gravenmier, Jeff Walter, and Thomas Miles

Major changes that occurred in Standards and Objectives

Changes in the evaluation of alternatives are a result of changes in the DEIS objectives and standards. Some changes clarified understanding or improved the methods of modeling and data analysis. There are no substantial changes in the long-term (50 to 100 year) projections and interpretations. The evaluation of effects for the long-term projected outcomes could not be improved given the time available for this evaluation.

- The short- and long-term model projections of landscape processes and functions provide moderate confidence in outcomes because of the scale of mapping. Mapping was accomplished at the management region and forest/range PVG group level with statistical data table relationships to infer trends for finer scale stratifications. There was not adequate time during the previous evaluation or this re-evaluation to map to the scale of Potential Vegetation Groups (PVGs) and develop relationships for effects of the fine-scale standards.

  The projection models cannot be applied at a scale to account for changes, refinements, and

additions of fine-scale standards that are relatively independent from the model simulations. An assumption is made that after the first decade the alternative themes and Desired Future Conditions (DFCs) will predominate and conflicts with fine-scale standards will be resolved through hierarchical landscape assessment and associated decisions. Consequently, the long term relative differences in trends between the alternatives remain the same.

- There has been considerable refinement of standards and improved clarity of the differences between alternatives for the short term (first decade). However, there appears to be increased potential for conflict between standards and estimated activity levels in achieving the action alternative (3 through 7) goals, alternative themes, and desired future conditions (DFCs). This potential for conflict was not as evident in the February 1996 version as it is in the February 1997 version. For the earlier evaluation an assumption was made that a hierarchical landscape assessment, implementation, monitoring, and evaluation process would resolve these conflicts to varying degrees for alternatives 3, 4, 5, 6, and 7 (see table 4-1 in DEIS chapter 4). However, the revised draft EIS alternatives present some conflicts that can result in a variety of outcomes in the first decade. For Alternatives 3 through 7, this resulted in some modification of assumptions to eliminate the conflicts.

However, there are changes in the short-term (first decade) potential outcomes:

- There is a change in the projected rate of transition to the DFCs during the first decade, caused by changes in some standards, improved understanding of the standards, and improved methods of evaluation. This has resulted in changes in some of the original projected effects for Chapter 4 of the DEISs, as well as the addition of new material. The slowdown in transition to the DFCs caused by changes in standards primarily affected Alternatives 3 and 7.

Improved understanding relative to key components of the action alternatives affected Alternatives 3, 4, 5, 6, and 7. This included:

1) A more realistic understanding of the time of transition from the current traditional management to ecological management for the action alternatives. This transition time is a result of the need for technology transfer, multi-scale integrated risk and opportunity analysis, spatial prioritization, subbasin review, ecosystem analysis, collaboration, and design and implementation of ecological conservation, restoration and production activities.

2) The intent in Alternatives 3, 4, 6, and 7 for prioritization of restoration and production activities in the BLM/FS wildland interface with private land urban and rural housing developments.

3) The transition time to develop wilderness prescribed natural fire plans for planned ignitions to achieve the desired futures for Alternatives 3, 4, 6, and 7.

Types of Change in Landscape Dynamics

Minor changes were made in the types of management in Alternatives 1 and 2 (no action alternatives) to correct earlier interpretation of these alternatives. These changes were recognized in the first evaluation of alternatives and accounted for in the qualitative discussion in the Landscape Ecology Chapter's methods section (see Chapter 2 of this document).

For this re-evaluation reliance shifted to different types of data and models for evaluating differences between alternatives. This includes an increased reliance on the type of management prescription model, with its associated long-term effects and assumptions, rather than the modeled projections of amounts of vegetation types and disturbances. The implications of these models retain some level of confidence in detecting differences between alternatives even with substantial conflicts

between goals, themes, DFCs, activity levels and standards. In addition, the models are not as susceptible to differences between alternatives being minimized by the coarse resolution of mapping. Descriptions of these models and how they were mapped are included in Chapter 2 of this report.

This re-evaluation reduces the emphasis on quantitative projections of vegetation types and disturbances, which are much more susceptible to conflicts between the goals, themes, DFCs, activity levels, and standards, as well as loss of resolution due to the coarse scale.

Several generalized quantitative measures (landscape health, soil disturbance, succession/disturbance regimes, landscape patterns, and transition times of the different models) were developed that are less susceptible to loss of confidence due to the conflicts of standards and alternative themes.

From a landscape ecology perspective, the rate of landscape change caused by implementing an alternative can be measured by the similarity to the various landscape patterns of succession/disturbance regimes for the desired management model. When this similarity is measured through time a transition rate can be evaluated.

There are two general types of management responses:

1) the traditional management response — Traditional management focuses on sustained yield, protection, or exploitation of specific elements, such as timber production, livestock grazing, wilderness, and riparian buffers, in a manner relatively independent of the interconnected cause-and-effect relationships across landscapes. Consequently, the interaction of effects between managed elements, other elements, and dynamics of landscape disturbances often conflict. In the long term this type of management can result in disequilibrium of ecological systems and decline in ability to produce expected human resource values (both commodity and amenity). This results in the loss of landscape health.

Landscapes in traditional commodity patterns are predominantly early- or mid-seral, highly fragmented, and lack large overstory and emergent live and dead tree characteristics in the forest landscapes. The range landscapes often have widespread effects of soil erosion and exotic plant invasion. These landscapes require a long period of careful application of conservation, restoration, and production activities to develop the landscape elements and patterns representative of the proper functioning system.

2) the ecological management response — Ecosystem management promotes the transition of current landscape patterns toward healthy (proper functioning) landscape systems by utilizing human technology and energy to mitigate or restore interacting cause-and-effect relationships. These activities are designed to represent the ecological equilibrium interactions, while producing human resource values (both commodity and amenity). In the short term, ecological management is expected to stabilize landscapes that are currently in disequilibrium and slowly increase their predictability of providing for human resource values (both commodity and amenity). In the long term, ecological management is expected to increase a system's ability to produce human resource values at lower cost, while sustaining landscape capability and native biodiversity.

The transition time from the current condition to landscape health for the ecological management response is dependent on the status of the current pattern. Landscapes in traditional reserve patterns that are predominantly mature or late-seral can be transitioned rapidly to healthy landscape (proper functioning) system patterns with conservation, restoration, and production activities. This is because the large overstory and emergent live and dead trees are still present in the forest landscapes, and exotics or soil erosion have not precluded native system potentials in the rangeland landscapes. In contrast, landscapes in traditional reserve patterns that have been cycled by a severe disturbance event have often lost large overstory and emergent live and dead tree characteristics. These landscapes require a long period of careful

application of conservation, restoration, and production activities to develop landscape elements and patterns representative of healthy landscapes.

Alternatives 1 and 2 (the no action alternatives) fit the traditional management response. The desired future for Alternative 1 in roaded, non-wilderness areas would generally fit the traditional commodity pattern for forest landscapes, range landscapes, and forest-range landscapes. In contrast, the desired future for Alternative 1 in wilderness areas would generally fit the traditional reserve pattern for forest landscapes, range landscapes, and forest-range landscapes. Alternative 2 would be similar to Alternative 1 in wilderness, but the non-wilderness would be a fragmented combination of the traditional reserve and results of historic management patterns along stream buffers and in remaining late-seral forest areas, and the traditional commodity management patterns in the upland rangeland and mid-seral forest types.

To varying degrees Alternative 3, 4, 5, 6, and 7 fit the ecological management response. The desired future for Alternatives 4 and 6 would fit the healthy landscape (properly functioning system) pattern for forest landscapes, rangeland landscapes, and forest-range landscapes. While Alternatives 3 and 5 have a DFC for ecosystem management that fits the ecological management response, the emphasis on local priorities for Alternative 3 and production priorities for Alternative 5 would not provide an equal emphasis for conservation, restoration, and production activities based on risks and opportunities across the Basin. Consequently, Alternatives 3 and 5 would result in a mix of ecological and traditional responses. Alternative 3, because of the local emphasis, would have a fine-scale mix caused by local priorities, while Alternative 5, because of the emphasis for activities in more productive areas, would have a coarser scale mix related to potential vegetation and current condition composition.

Alternative 7 has a very conflicting result caused by the mixing of the ecological and traditional responses in the theme and DFCs, as well as in the standards. This would result in traditional reserve patterns clumped in the reserves, and a mix of traditional reserve, commodity, and proper functioning systems patterns on the other lands. While action activities would be the dominant activities causing direct change in Alternatives 3, 4, 5, and 6, other disturbances, such as wildfire, drought, stress mortality, insect/disease mortality, and exotic invasion would predominate in alternative 7.

Areas that currently fit the healthy landscape pattern are relatively easy to maintain through representation of cause-and-effect relationships with application of conservation, restoration, and production activities.

Transition rates from current landscape conditions to the desired future landscape conditions were estimated for each alternative. The estimate considers the likely similarity of the landscape pattern of succession/disturbance regimes to the desired future landscape systems. These transition rates are described in the sections below with reference to short-and long-term trends.

Landscape Health Evaluation

Rangeland landscape patterns — In the next 10 years, none of the alternatives would change to healthy landscapes because landscape patterns of rangeland vegetation composition and structure respond very slowly to changes in management.

In the long term (50- to 100-years), Alternatives 4 and 6 would show a high rate of transition toward healthy landscapes, and Alternative 3 would show a moderate trend toward healthy landscapes. Alternatives 5 and 7 would have a low rate of transition, and Alternatives 1 and 2 would result in no change.

Forest landscape patterns — Alternatives 1, 2, 3, 5, or 7 would show no change in trend toward healthy landscapes in the next 10 years, Alternative 4 would produce a moderate transition in the short term. Alternative 6 would result in low achievement of healthy landscapes in the short term.

Alternative 4 would produce a high transition rate to healthy landscapes in the long term. Alternative 6 would respond at a slower rate in the long term than Alternative 4, because the low rate of activities in the first 10 years would result in substantial differences in disturbance and succession. The long-term trend for forest landscape patterns in Alternatives 1 and 2 would not change, while Alternatives 3, 5, and 7 would result in a low rate of transition to healthy landscapes.

Forest-rangeland landscape mosaics — None of alternatives would result in a transition to healthy landscapes in the short term, because of slow response in forest-rangeland landscape mosaics to changes in management.

In the long term, the response of the forest-rangeland landscape mosaics would differ from either forest or rangeland landscapes. Alternative 4 would produce a high positive trend toward healthy landscapes, and Alternatives 3 and 5 would show a low trend toward healthy landscapes, with Alternative 6 ranking as moderate. Alternatives 1, 2, and 7 would result in continued transition away from healthy landscapes; Alternative 7 would not produce a net transition because the dynamics of fire, fuels, exotic plants, and succession within reserves would not trend toward a healthy balance in the long term.

Dry grass and dry shrub potential vegetation groups — In the short term, Alternatives 3 and 4 would result in a moderate trend toward healthy landscapes, due to the strong emphasis on perennial grass and shrub restoration through control of noxious weeds and management to reduce cheatgrass and other exotic annuals. In contrast, there would be no trend toward healthy landscapes for Alternatives 1 and 2, and only a low rate of transition to healthy landscapes for Alternatives 5, 6, and 7.

In the long term, Alternative 4, with its high restoration emphasis, would result in a high transition toward healthy landscapes. Alternatives 3, 6, and 7 would reach a moderate transition level to healthy landscapes in the long term, and Alternative 5 would remain low in its ability to achieve healthy landscape systems. Alternatives 1 and 2 would continue their trend away from healthy landscapes in the long term.

Cool shrub potential vegetation group — In the short term under Alternatives 3, 4, 5, and 7, there would be a moderate trend toward healthy landscapes due to relatively rapid response of cool shrublands to treatments such as improved grazing management or weed control compared to the dry shrub and dry grass potential vegetation groups. Alternative 6 has a low trend because of a lower level of activities in the next 10 years. In contrast, cool shrublands would not trend toward healthy landscapes under Alternatives 1 and 2, in the short term.

In the long term, Alternatives 4 and 6 would result in a high transition to healthy landscapes due to a high emphasis on restoration, including livestock grazing management. Alternatives 3, 5, and 7 would show a moderate trend toward healthy landscapes. Cool shrublands would not trend toward healthy landscapes under Alternatives 1 and 2 in the long term.

Woodland potential vegetation group — In the short term under Alternatives 3, 4, 5, and 7, there would be a low trend toward healthy landscapes due to limitations in technology. Alternative 6 would result in moderate transition to healthy landscapes due to emphasis on technology development; Alternatives 1 and 2 would show no trend toward healthy landscapes.

In the long term, Alternatives 4 and 6 would produce a high trend toward healthy landscapes; Alternatives 3, 5, and 7 would produce a moderate trend; and Alternatives 1 and 2 show no trend toward healthy landscapes.

Rangeland riparian potential vegetation group — In the short term, the strong emphasis on riparian restoration in Alternatives 3, 4, and 6 is predicted to produce a moderate trend toward healthy landscapes. A moderate transition to healthy landscapes is also predicted for Alternative 7 as a result of the removal of livestock grazing

pressure. Alternatives 2 and 5 would have a low rate of trend, and Alternative 1 would show no transition toward healthy landscapes.

In the long term, Alternatives 1 and 5 would result in a low, Alternative 2 in a moderate, and Alternatives 3, 4, 6, and 7 in a high trend toward healthy landscapes.

Dry forest potential vegetation group — Historically, a mixture of stable and cyclic succession/disturbance regimes were produced with mosaics of open to somewhat closed forests dominated by ponderosa pine or Douglas-fir. Similar disturbance effects need to be restored or imitated for the dry forest potential vegetation group to trend toward healthy landscapes. In the short term, Alternatives 1 and 2 would result in no trend to healthy landscapes. Alternatives 3, 4, and EEIS:7 would produce a moderate trend to healthy landscapes, with Alternative 4 showing a quicker shift toward healthy landscapes because of its emphasis on restoration. Alternatives 5, 6, and UCRB:7 show a low trend due to low rates of restoration.

In the long term, Alternatives 3, 4, and 6 would produce a high trend toward healthy landscapes because of the emphasis on prescribed fire, thinning of dense stands, and promoting early-seral shade-intolerant and large trees. Alternatives 5 and EEIS:7 would show a moderate trend toward healthy landscapes, Alternative UCRB:7 would be low, and Alternatives 1 and 2 would result in no trend to healthy landscapes in the long term.

Moist forest potential vegetation group — This includes some of the most productive land in the project area. In the absence of disturbance, biomass accumulates rapidly and competition for available carbon and water increases. Achieving healthy landscapes would mean increasing the amount of late-seral forest with a corresponding decrease in mid-seral forest, as well as promoting ponderosa pine, western larch and western white pine. In the short term, Alternatives 3, 4, and 5 would result in a moderate trend to healthy landscapes, while Alternative 6 would be low.

In the long term, Alternatives 4 and 6 would have a high transition toward healthy landscapes because of their restoration emphasis. Alternatives 3 and 5 would have a moderate transition rate toward healthy landscapes. In the short and long term, Alternatives 1 and 2 would show no trend toward healthy landscapes and Alternative 7 would show a low trend due to the imbalance of succession and disturbance in reserves and the lack of emphasis on western white pine restoration.

Cold forest potential vegetation group — Unlike the dry and moist forests, the cold forest has less frequent disturbance and slower succession rates; therefore, conditions generally are closer to the historical range of variability. However, traditional fire suppression practices have resulted in simplification of landscape patterns, and whitebark pine is declining rapidly from effects of blister rust and fire exclusion. In the short term, Alternatives 3, 4, and 5 would have a moderate trend and Alternative 6 would have a low trend toward healthy landscapes.

In the long term, Alternatives 4 and 6 would have a high probability of transition to healthy landscapes because of their emphasis on restoration, while Alternative 5 would have a moderate trend. In the short and long term, Alternative 7 would result in a low transition to healthy landscapes because of imbalance between successional conditions and disturbance processes and the lack of emphasis on whitebark pine restoration. Alternatives 1 and 2 would result in no trend toward healthy landscapes.

Alpine potential vegetation group — This is a sensitive ecosystem which has low productivity and slow rates of succession. Because of the slow rates of response to restoration, none of the alternatives would produce a high trend toward healthy landscapes in either the short or the long term. Alternatives 1 and 2 rated low, and Alternatives 3, 4, and 6 rated moderate in trend toward healthy landscapes in the short and long term. Alternatives 5 and 7 rated low in the short term and moderate in the long term.

Forest soil disturbance — Alternatives that would increase the amount and intensity of soil disturbance would be more likely to harm soil stability, function, and productivity. Soil disturbance can come from a number of sources, including timber harvest and thinning, wild and prescribed fires, roads, recreation, and livestock and wildlife grazing. Alternative 1 would have the greatest amount of soil disturbance in the long and short term with no trend toward healthy landscapes. Alternatives 2, 5, and 7 would result in low probability of reducing soil disturbance in the short term. This trend would remain low for Alternative 2 in the long term. Alternatives 3, 4, and 6 would result in a moderate trend to healthy landscapes in the short and long term, because of higher levels of restoration activities or mitigation for best management practices (BMPs) that resemble natural succession/disturbance regimes. Alternatives 5 and 7 would have low rates in the first decade increasing to moderate levels in the long term.

Rangeland soil disturbance — The emphasis on soil protection through improved vegetation management and livestock grazing systems, and the resultant improvements in residual cover, would produce a moderate trend toward reduction in the short and long term under Alternatives 3 and 4. For Alternative 6, this moderate trend would improve to high in the long term. Alternatives 5 and 7 would produce a low trend in the short term because their lack of restoration emphasis would not reduce exotic plant invasion or effects of severe wildfire. In the long term, both alternatives would increase to moderate. Alternatives 1 and 2 show no ability to achieve healthy landscapes in either the short or the long term.

Noxious weed risk reduction — In forest and rangeland systems, Alternatives 3 and 4, with their high emphasis on noxious weed control, would produce a high trend toward noxious weed risk reduction in both the short and long term. Alternatives 6 and 7, with less emphasis on activity levels that would reduce noxious weed spread, would produce a moderate trend toward healthy landscapes in both the short and long term. Alternative 5 would show a low trend and Alternatives 1 and 2 would show no trend toward weed reduction or healthy landscapes in either the short or long term.

Landscape-scale terrestrial habitats — In the short and long term, Alternative 4 would show moderate trends toward improvement due to the emphasis on active restoration of landscape-scale terrestrial habitats. In the short term, Alternatives 2, 3, 6, and 7, which have a lower emphasis on restoration activities, would show a low trend and Alternatives 1 and 5 would show no trend toward improving landscape-scale terrestrial habitats.

In the long term, Alternatives 4, 6, and 7 would produce moderate trends toward improvement, but none of the alternatives would produce high trends. The connectivity of terrestrial species populations has been altered by land uses and land ownership patterns that have fragmented many species habitats. This loss of connectivity prevents these fragmented populations from interbreeding, which puts them at risk. There is little that can be done on BLM- or Forest Service-administered lands alone, relative to landscape-scale conditions, to improve healthy landscapes above moderate levels.

Landscape-scale riparian habitats — Alternative 4 would show a high trend toward improvement in landscape-scale riparian habitats in both the short and long term. Alternative 6 would show a moderate ability to achieve healthy landscapes in the short term and a high rate in the long term. In the short and long term, Alternatives 3 and 7 would show a moderate trend and Alternative 1 would show no trend toward improvement of landscape-scale riparian habitats due to the lack of restoration. Alternative 5 has low and moderate trends for the short and long term, respectively. Although Alternative 2 would provide for more protection of riparian habitats, the lack of active restoration and fragmentation of terrestrial habitats would result in a low transition to healthy landscapes.

Risk reduction to human life and property from wildfire in the urban/wildland interface — This was a key variable for assessing healthy landscapes. Alternative 1 focuses on commodity elements, Alternative 2 on commodity elements with riparian and old forest protection, and Alternative 5 on economic efficiency. This would increase fragmentation of landscape mosaics, and would not focus on fuel conditions in the interface areas or on representation of disturbance regimes appropriate to healthy landscape systems. Therefore, there would be low or no levels of risk reduction under Alternatives 1, 2, and 5, in the short term; and in fact, it is anticipated that long-term risk under these alternatives would actually increase. In direct contrast, Alternative 4 focuses on fuel conditions in the interface areas and on representation of succession/disturbance regimes to reduce vulnerability to wildfire, resulting in high levels of wildfire risk reduction in the short and long term. Alternative 3 would have moderate and high transition levels for the short and long term, respectively. Alternative 6 would show low ability to achieve healthy landscapes in the short term, but would improve to high in the long term. In the short term under Alternative 7, current risk conditions would increase because reduced active wildfire suppression efforts would be coupled with continued increase in high-risk fuel conditions on lands near reserves. Although as wildfires reduce fuels, the long-term risk would decline and the transition to healthy landscapes would increase to a moderate rate. This would occur at a very high cost of wildfire suppression, risk to homeowners, and severity of disturbance effects.

Desired human commodity values (such as timber products and livestock forage) — Healthy landscape system response for desired human commodity values (such as timber products and livestock forage) is a paradox. The short-term transition to healthy landscapes with regard to commodities would be high under Alternative 1 and moderate under Alternatives 2, 3, and 4. However, because landscape relationships would become imbalanced, in the long term the availability of these commodities would decline and the trend toward healthy landscapes would drop to a moderate rate for Alternative 1 and low for Alternative 2. In the short term, Alternatives 4 and 5 would produce a moderate trend toward healthy landscapes, primarily as an offshoot of restoration activities. In the long term, Alternative 4 would transition to a high rate as conditions become balanced and commodity flows are produced with only low to moderate levels of restoration. However, Alternative 5 would decline to moderate as an imbalance develops in areas with low productivity and low restoration emphasis that are adjacent to areas where commodity production is a priority. Alternative 3 is moderate in both short and long term because of moderate levels of restoration and emphasis on connectivity. Alternative 6, with a short-term low trend, would increase to a moderate level in the long term. In the short and long term, Alternative 7 would rank low in its ability to achieve healthy landscapes with regard to commodity production.

Desired human amenity values (such as scenic values, clean air and water, and recovery of rare habitats) — The production of desired human amenity values (such as scenic values, clean air and water, and recovery of rare habitats) in healthy landscape systems is almost directly opposite to the production of commodity values for Alternatives 1 and 2. Alternatives 3 through 7 display varying levels in ability to produce a sustainable flow of amenities. Alternatives 1 and 2 would respond with low ability to achieve healthy landscapes in the short term and would actually result in a long-term decline of amenity values. Alternative 7 would sustain moderate levels of amenity values in the short and long term. Alternatives 3, 4, and 6 would produce only a moderate flow of amenity values in the short term, because many restoration activities (such as prescribed fire, extensive thinning, and road closures) can detract from amenity values. Alternative 3 would remain moderate in the long term because of lower investment in restoration. In the long term under Alternatives 4 and 6, as more landscapes become native in appearance, high lev-

els of amenity values would be available with only low to moderate levels of restoration.

Significance of Changes

The changes in the standards and objectives for the Alternatives will provide some clarity for the short term (first decade), but these changes appear to increase the potential for conflict between standards and estimated activity levels in achieving the action alternative goals, themes and desired future conditions (DFCs).

A combination of changes in some standards, clarification in understanding the standards, and improvement in methods of evaluation, caused a change in the evaluation in the rate of transition to the DFCs during the first decade.

The opportunity to simultaneously achieve the ecosystem management EIS goals using the lowest long-term investment in restoration and mitigation, appears to be highest with alternatives that have landscape patterns that are becoming consistent with:

- their biophysical succession/disturbance regimes,
- reduction of soil disturbance and decrease of exotic species invasion,
- restoration of landscape-scale native terrestrial and riparian habitats and appropriate connectivity,
- reduced fire risk in the urban and rural wildland interface, and
- provision of levels of human commodity and amenity values consistent with the other factors.

Alternatives 1 and 2 would provide no or low ability overall to achieve healthy landscape systems in either the short or the long term.

Alternative 3 would show moderate ability to achieve healthy landscapes in both the short and long term.

Alternative 4 would have a moderate ability to achieve healthy landscapes in the short term and a high ability in the long term.

Alternative 5 would have a low ability to achieve healthy landscapes in the short or long term.

Alternative 6 would have a low ability to achieve healthy landscapes in the short term but a high ability in the long term.

Alternative 7 would have low ability to achieve healthy landscapes in the short term and would show a moderate trend toward healthy landscapes in the long term.

Aquatic Ecology

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Major changes in Standards and Objectives

The February 1996 evaluation of effects on aquatic habitats and native fishes consisted of three steps. Step one identified the level of protection, maintenance, or restoration of aquatic and riparian habitats offered by each alternative. Step two identified changes in distribution and status of seven widely distributed salmonid species that could be expected under each alternative. Step three involved a similar, though less intensive, effort to identify expected changes in populations of eighteen more narrowly distributed fish species of special concern. This section reexamines the earlier conclusions in light of the most recent changes to the DEISs.

During the February 1996 evaluation, activity tables were "developed for each forest and range cluster by alternative to aid in analysis of effects, to allow projections of outcomes if the various alternatives were to be implemented, and to indicate relative differences among alternatives" (DEIS Chapter 3). The evaluation of aquatic effects used these spatial and temporal allocations of management activities and road densities to project potential management influences on fishes under each alternative. This included the development of four primary pieces of information: 1) a series of classification trees to associate current patterns in fish distributions with landscape characteristic,

which were then used to predict changes in fish distribution that might track changes in landscape characteristics; 2) a summary of anticipated road density changes across the current distribution of fishes; 3) a summary of the current ownership and management emphasis for the current distribution of fishes; and 4) a summary of the anticipated intensity of management activities across the current distribution of fishes. Each of these provided a sense of where and to what extent anticipated levels of management activity for each alternative would likely influence each of the fish species considered.

Because the recent DEIS changes do not require changes to the activity tables used in the February 1996 evaluation, projected trends from the earlier analysis in allocation of roads and other land-disturbing activities, and in landscape-level allocation of restoration activities still apply. These trends were instrumental in the evaluation of differences between alternatives.

In both the February 1996 evaluation and this review, the aquatic and riparian conservation strategies were evaluated based on riparian area interim widths and activities allowed within them, treatment of strongholds and at-risk populations, treatment of priority watersheds or aquatic categories, amount and guidance of watershed and riparian restoration, and other major assumptions. Central to the evaluation is the assumption that Ecosystem Analysis at the Watershed Scale[1] allows landscape, forest, and aquatic/riparian objectives to be met with greater efficiency and effectiveness, given the ecological variability among and within subwatersheds and subbasins. Therefore, the more area which requires ecosystem analysis, the more certainty in the minds of the reviewers that the alternative's objectives will be met for ecological as well as economic and social reasons.

Riparian widths and activities — The area of land within Riparian Conservation Areas (RCAs) (which direct management activities for the purposes of protection and restoration of aquatic and riparian function and structure) among the alternatives did not change significantly with the DEIS changes. Alternatives 6 and 4 still contain the largest RCA areas, followed by Alternatives 7, 3, 2, 5, and 1 in descending order. In earlier preliminary draft EISs, Alternatives 4 and 6 (and 5 outside commodity areas) interim RCA widths and standards could be modified only after ecosystem analysis. In the February 1996 evaluation, it was assumed that modifications would not result in degradation or halt restoration trends in habitats, populations or riparian condition, and therefore received positive evaluations if Ecosystem Analysis at the Watershed Scale were completed. In the revised DEIS, Alternatives 3, 4, 5 (outside commodity emphasis areas), and 7 now allow for modification of standards only after Ecosystem Analysis at the Watershed Scale is conducted. The original assumption applies. Aquatic and riparian protection, then, is strengthened for Alternative 3, and remains much the same as in the earlier evaluation for Alternatives 4, 5, and 7. Alternative 6 now provides a four-year transition period in which changes to EIS standards can be made without ecosystem analysis in areas where Ecosystem Analysis at the Watershed Scale is not required. The change to Alternative 6 is less risky now because of the large area in which Ecosystem Analysis at the Watershed Scale is required, and the requirement that subbasin reviews would be completed in one year. The conclusion is that protection and restoration potential under Alternative 6 improved from the earlier evaluation.

The DEIS changes in Alternative 4 prohibiting site-specific modifications to standards, RCA widths, and Riparian Management Objectives (RMOs) without Ecosystem Analysis at the Watershed Scale create some confusion and uncertainty. For example, there are very few prescriptive standards which a manager would want or need to change in order to manage vegetation within RCAs. Both a project-scale NEPA document or

[1]Ecosystem Analysis at the Watershed Scale, Federal Guide for Watershed Analysis, version 2.2, revised August 1995. The analysis process includes topic areas to ensure that analyses demonstrate a basic understanding and knowledge of the watershed.

an ecosystem analysis logic trail can be used to describe how timber or vegetative management shall benefit aquatic and riparian processes and function. Standards for Alternatives 4, parts of 5, and 6 clearly outline the primary purpose of RCAs, specifying "vegetation management shall be conducted only to protect, maintain, or restore riparian and instream processes and functions and to meet the intent of zones 1, 2a, and 2b...timely opportunities shall be provided to interagency partners for agreement on vegetation management activities in RCAs."

Uncertainty in Alternative 4 arises because a much smaller area of the landscape triggers Ecosystem Analysis at the Watershed Scale, and implementation of RCA objectives could be achieved project by uncoordinated project. At least three possibilities for interpretation of this alternative exist: 1) it involves greater risk for aquatic and riparian resources than Alternatives 2, 3, 6, and 7 because of aggressive, project-scale implementation of activities and restoration, which make this less of an ecosystem/landscape management alternative without focused restoration priorities; 2) it is a reserve-type system centered around RCAs which would affect between 25 to 50 percent of the landscape (in this case, RCA widths on intermittent streams are not modified and vegetation management is very conservative within the entire RCA; thus landscape restoration and minimizing of landscape disturbance patterns would not be achieved); or 3) the alternative is much like Alternative 6, with managers deciding that landscape management requires the modification of standards, Ecosystem Analysis at the Watershed Scale is conducted, and the information base from which to proceed in a prudent manner is acquired. The first possibility has greater short-term and long-term risks and uncertainty surrounding it. The second possibility has less short-term risk and more long-term risk of not meeting watershed, terrestrial and landscape standards and objectives. The third would afford the least risky ecological solution. Given that activity levels have not changed for Alternative 4, more risk and uncertainty is assumed for it to meet goals and objectives. The positive side of this alternative is that the aggressive activity levels have the potential for accelerated learning under the adaptive management paradigm, if effective monitoring accompanies implementation.

Treatment of Strongholds and At-Risk Populations — The February 1996 alternatives required ecosystem analysis in strongholds of native salmonids in Category 2 and 3 subbasins for Alternatives 3, 4, 5 (outside commodity areas), and 6. The recent DEIS changes in alternatives 3-7 provide specific objectives to protect or restore strongholds in Category 2, and to protect strongholds in Category 3 subbasins. However, there are now no standards coupled with those objectives. Instead, the standards which trigger Ecosystem Analysis at the Watershed Scale are in the Implementing Ecosystem Management section. The standards for Alternatives 3, 6 and 7 are quite similar to those evaluated earlier. In Alternative 4, they are tied only to federally listed and proposed species. Alternative 4 then becomes much more species-centric and less an ecosystem management strategy. This raises further concerns about the ability to achieve the goals and objectives of the alternative. The February 1996 evaluation relied on models which used strong, depressed, and fringe population distributions to examine the overlap with activities, management intensities, and road densities for each alternative. These models did not change for this current review.

Treatment of Priority Watersheds and Category Watersheds — Subbasin reviews are defined as to what they are and where and when they must be completed in the revised DEISs. In both the February 1996 and present evaluations, it was assumed that strongholds can be identified and verified with subbasin analysis. It was further assumed that aquatic categories can be amended and verified through subbasin reviews.

Road Management — The February 1996 evaluation assumed that the requirement for development and implementation of a standardized road condition and risk inventory would be met early in the life of the plan in order to estab-

lish watershed restoration priorities. If it was not, watershed restoration outcomes would be uncertain and the intent of Alternatives 3 through 7 would be more difficult to meet. If an accurate road inventory is not completed, subbasin reviews and Ecosystem Analysis at the Watershed Scale cannot effectively address road-related risks or restoration needs. This assumption still applies, given the required inventory specified by the standards. In addition, specific direction is given for road reduction, net increases of roads to no more than one road-density class for Alternatives 3, 4, and 5, and no net increases in roads in low roaded areas unless Ecosystem Analysis at the Watershed Scale is conducted for Alternatives 6 and 7.

Key Salmonid Species Effects

The following discussion focuses primarily on the key salmonid species and how the February 1996 evaluation might change in response to the changes in alternatives.

Alternatives 1 and 2 — No changes are needed in the evaluation.

Alternative 3 — Ecosystem Analysis at the Watershed Scale will be required in stronghold subwatersheds and across the distributions of wild stream-type chinook, steelhead, and most if not all of that for bull trout. Most species will generally benefit through better planned restoration activities where they occur. The effect of the changes in Alternative 3 for redband and cutthroat trout are ambiguous; each should benefit where they overlap with the trigger species, but substantial portions of the ranges for allopatric redband trout (those outside the range of steelhead) and Yellowstone cutthroat trout fall outside these areas. The distribution of westslope cutthroat trout strongly overlaps the distributions of the anadromous stocks and bull trout, which should benefit westslope cutthroat trout. Overall, changes in the alternative suggest a net improvement over the earlier projections for stream-type chinook salmon, steelhead, bull trout, and probably westslope cutthroat trout, and a positive but marginal improvement for redband trout. No important change in projections for Yellowstone cutthroat trout is anticipated.

Alternative 4 — The requirement for Ecosystem Analysis at the Watershed Scale in subwatersheds that support listed species will extend over much of the stream-type chinook salmon and steelhead distributions in the Snake River Basin and in upper Washington, but not in central Oregon. Restoration activities guided by Ecosystem Analysis at the Watershed Scale may conserve and restore chinook and steelhead habitats in those areas better than previously projected. That positive change is confounded by uncertainty with implementation. Activities within the core of strongholds for stream-type chinook salmon, steelhead, and some redband trout in central Oregon do not require Ecosystem Analysis at the Watershed Scale. The high timber harvest and thinning activity levels expected in central Oregon, and the potential lack of Ecosystem Analysis at the Watershed Scale means that risks are higher and the probability of effectively focusing forest and watershed restoration is lower. The ultimate effect depends heavily on how the alternative is implemented.

Changes in this alternative have mixed implications for other species. Those parts of the distributions of bull trout, westslope cutthroat, and redband trout that overlap with federally listed stocks are likely to benefit. Category 1, FEMAT key watersheds, and wilderness areas cover important strongholds for westslope cutthroat and bull trout, and the additional requirements should increase benefits throughout important parts of their ranges. However, the elimination of the requirement for Ecosystem Analysis at the Watershed Scale in strongholds will result in a net reduction of analysis and thus greater risks in a large part of the distributions and species outside trigger areas. This should be most relevant in the fringe for westslope cutthroat and in much of the range of allopatric redband and Yellowstone cutthroat trout.

If bull trout are listed (currently Category 1 candidates with review pending), Ecosystem Analysis

at the Watershed Scale will be required over a much larger part of the region outside the range of listed and proposed salmon and steelhead, although it still would not cover the core area for stream-type chinook, steelhead, and redband trout in central Oregon. This should lead to better restoration of depressed and fringe populations of bull trout, and a substantial (though incomplete) extension of that action for some strong and many depressed and fringe populations of westslope cutthroat trout and sympatric redband trout. Increased benefits for allopatric and fringe redband populations will be limited, and no change in the projections for Yellowstone cutthroat trout are expected. With listing of bull trout, Alternative 4 will provide more comprehensive coverage of aquatic habitats needing restoration. Listing of bull trout will not influence the uncertainty in the implementation of Alternative 4.

Alternative 5 — The primary changes in Alternative 5 follow from those in Alternative 4. Outside of the timber and livestock emphasis areas, changes in the requirements for Ecosystem Analysis at the Watershed Scale should lead to some benefits with more focused and effective restoration activities across a large part of the distributions of stream-type chinook salmon and steelhead. Because the listed or proposed stocks fall largely outside the timber and livestock emphasis areas, changes in projections should be generally equivalent to those in Alternative 4.

Alternative 6 — The initial (first 4 years) requirement for Ecosystem Analysis at the Watershed Scale across the entire distributions of listed and candidate species and the fringe distributions for all salmonids, substantially expands the area subject to analysis. After four years, Ecosystem Analysis at the Watershed Scale is required in all watersheds. In addition, an Ecosystem Analysis at the Watershed Scale for subwatersheds with less than 0.7 road miles per square mile is required. These changes should improve projections relative to the February 1996 evaluation for all species across important parts of their current distributions. The benefits are most likely in the depressed and fringe portions of these distributions that were not previously addressed in Alternative 6, or in any other alternative. These changes, in concert with the more moderate levels of timber harvest and thinning activities, strengthen this alternative and make it among the most likely to conserve and rebuild depressed and fringe populations. Despite the improvements, the alternative does not ensure that some further declines will not occur. The inability to prevent further declines is an aspect of all alternatives, and is discussed below.

Alternative 7 — Requirements for Ecosystem Analysis at the Watershed Scale are increased under Alternative 7 to include the distribution of listed species not covered by the Northwest Forest Plan, subwatersheds with less than 0.7 road miles per square mile, and to be prior to management activities within RCAs. Although the increased reliance on analysis should more effectively focus restoration and management activities, the relatively limited amount of restoration activity expected under this alternative means that those changes will not produce much different results than originally projected.

Significance of Changes

In general the changes to the alternatives represented by the standards of the Aquatic Strategies strengthened the content or application of riparian conservation measures. This should effectively increase the protection of riparian and watershed processes that influence habitats for fishes across the alternatives. It is most likely to benefit habitats and populations that are currently in good condition, because these areas are less likely to be degraded by future activities given the increased protection. Watersheds, habitats, and aquatic ecosystems that are currently healthy are more likely to remain healthy under the revised standards.

Watersheds and populations that are degraded or depressed will also benefit through long-term recovery of habitats and watershed processes. The legacy of roading, introduced species, and any new pressures associated with increasing land

management demands, however, could make passive recovery very slow or unlikely in many systems. Active restoration of watersheds (such as the obliteration of roads and elimination of channel crossings) will be critical to long-term management and restoration of productive and resilient aquatic ecosystems. For this reason, the interpretation of alternatives is based strongly on the expectation that Ecosystem Analysis at the Watershed Scale would change standards to more closely reflect the forests and landforms to which they apply. It was generally assumed that while effectively managed RCAs are key to conservation and restoration of aquatic habitats, the cumulative effects of land-use management, and the benefits realized from active restoration will be strongly dependent on understanding existing forest and watershed conditions, and the disturbances and processes likely to influence those conditions in the future. Restoration will be of little value if it is in not in the right place and does address the right problems. Even the strictest riparian standards may not mitigate excessive disturbance outside the buffers. Focusing and prioritizing management activities and managing cumulative effects in ways that minimize risks and maximize potential benefits is far more likely through Ecosystem Analysis at the Watershed Scale than not.

These issues represent a basic tension in the original analysis and this review. To conserve and restore healthy fish populations, it is necessary to conserve and restore forest, watershed, and riparian processes and conditions. Restoration activities can provide important benefits, but are often associated with land management activities that carry increased risks. Determining the cumulative outcome of multiple activities that can entail both lower and higher risks is difficult at this scale of analysis.

On the whole, changes in Alternatives 2, 3, 4, 6, and 7 will improve overall conditions for the species evaluated. All were generally strengthened relative to the February 1996 preliminary draft, although the patterns of protection and risks may have changed. The cores/strongholds for most species distributions (that is, the areas where habitats and populations are generally in good shape) are likely to remain that way. Three exceptions are redband trout, steelhead, and stream-type chinook salmon. In central Oregon under Alternative 4, the potential for high land-disturbing activities (timber and thinning), uncertainty in implementation, and no requirement for Ecosystem Analysis at the Watershed Scale make the outcome uncertain.

Outside the core/stronghold habitats, the ecological tradeoffs between riskier management activities and restoration activities are more difficult to interpret, thus increasing uncertainty. Several of the original interpretations regarding the ability of the alternatives to prevent further declines in the status or distribution of the key salmonids have changed. For each species except Yellowstone cutthroat trout, downgrading the projections represents an oversight in original analysis rather than increased skepticism with the current draft. With the exception of bull trout in Alternative 3, and all species in Alternative 6, the concerns regarding restoration of habitats or rebuilding of populations in the more depressed, fragmented or fringe portions of these species' distributions have not changed. The legacy of past land management activities, introduced species, and habitat fragmentation is important. Whether the benefits from restoration can be enough to overcome the negative trends (inertia) from the past simply cannot be determined. For reasons outside the scope of Federal land management, some populations may continue to decline. The population condition, trend, and isolation at the subwatershed scale will not be able to improve rapidly enough to prevent population declines in the short term, given the long time lags required for watershed and forest improvement.

The original analysis was based largely on the anticipated effects of the alternatives on seven key salmonids. Although these fishes are important, they are broad indicators of aquatic ecological conditions. The revision of the EIS has focused the triggers for analysis and some standards more strongly on the distribution of select threatened

and endangered species (that is, listed salmon and steelhead or bull trout) in some alternatives more than before. Some alternatives now seem to be a collection of fine-filter strategies more sensitive to current issues than to broad ecological process, function, and integrity. Although focused strategies and specific standards can have direct benefits for indicator species, a broad, integrated analysis is necessary to recognize and establish priorities which provide for the integrity of whole systems and landscapes. Alternatives that require Ecosystem Analysis at the Watershed Scale in concert with broader scale planning and analysis within subbasin review are more likely to meet the intent of ecosystem management and the integration of objectives across terrestrial, aquatic, and social systems.

Terrestrial Ecology

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Major Changes that Occurred in Standards and Objectives

Implementing Ecosystem Management — A number of standards were changed to better establish the priorities for accomplishing subbasin reviews and Ecosystem Analysis at the Watershed Scale. These changes are reviewed more thoroughly by the Aquatic Team. Some of these provisions were clearly intended to benefit terrestrial species, such as the requirement that ecosystem analysis under Alternative 6 be completed prior to activities that would affect large blocks of intact native rangeland. Provisions affecting the priority for accomplishing ecosystem analysis will also influence timing of activities within the first decade as discussed by the Landscape Analysis team. However, none of the changes are expected to have a direct effect on long-term outcomes for terrestrial species.

The initial terrestrial analysis assumed that ecosystem analysis would be an integral part of the implementation process and would include consideration of plant and animal species. The new provisions will contribute to the validation of this assumption.

The small changes in rate of implementation resulting from these provisions are unlikely to affect outcomes for terrestrial species which were projected through 100 years. Long term landscape outcomes are not expected to be changed by the new provisions, so habitat outcomes for terrestrial species would only be changed if the modified rate of implementation resulted in habitat bottlenecks in the very near term.

An additional consideration for the terrestrial analysis is the increased clarity of the intent to change standards through the process of ecosystem analysis. This places even more importance on the assumption in the terrestrial analysis that terrestrial plant and animal species be considered in ecosystem analysis. It should be obvious that changes in standards that will affect management of habitats have to be based on consideration of all species that will potentially be influenced. This assumption should be reflected throughout the development and implementation of the ecosystem analysis process.

Physical Environment — No changes affecting the terrestrial analysis have been made in this section. However, the added detail in the terrestrial habitat standards for snags and down wood make it clear that there are differences between the soils, habitat and fire standards for these ecosystem components. Reconciling these differences between draft and final will be essential. For this review, it is assumed that the most stringent of the standards apply (see discussion on terrestrial habitat standards).

Terrestrial Strategy — New objectives and standards place added emphasis on the maintenance of native plant species and will be considered as potentially increasing likelihoods that plant species viability will be maintained. This potential benefit was considered in the Terrestrial Team's review of outcomes for vascular plants. Several other standards in this section direct the management of mature/old trees and forests out-

side of reserves in Alternative 7 and were added after the February 1996 preliminary draft version. Although these standards were under development at the time of the terrestrial analysis, their intent was fully reflected in the Terrestrial Team's evaluation of the February 1996 version. Therefore, the influence of these standards was considered to already be incorporated in the terrestrial analysis.

Aquatic/Riparian Strategy — Several pieces of the aquatic conservation strategy have changed from the information that was used by the terrestrial team in February 1996. These changes, discussed below, are considered in this review of outcomes for plants and vertebrates.

Most significant of these changes is the use of the slope adjustment factor and the resulting addition of riparian management zone 2b to the Riparian Conservation Areas (RCAs). The slope adjustment factor was not considered in the Terrestrial Team's February 1996 analysis. It could provide additional benefit to species associated with riparian habitats in Alternatives 4 and 6, and Alternative 5 outside of timber emphasis areas. The added benefit will be most pronounced along intermittent streams in steeply-sloped drainages. This potential improvement in outcome is considered in this review of habitat outcomes.

For Alternative 7, the terrestrial analysis of February 1996 was based on the assumption of a 100-foot minimum buffer on intermittent streams. However, this minimum buffer width is actually 150 feet. This increased riparian protection is considered in this review.

Another change from the Terrestrial Team's understanding of the aquatic strategy in February 1996 involves the standard for buffers around ponds, lakes, and wetlands less than one acre in size under Alternatives 2, 3, and 7. This was thought to be 100 feet at the time of the terrestrial analysis, but is now understood to be 50 feet, except in key and priority watersheds (as defined by PACFISH/INFISH) where the 100 foot minimum applies. For Alternative 5, the February 1996 evaluation assumed no buffer around forested wetlands and the use of the Proper Functioning Condition[2] (PFC) concept around rangeland wetlands. Alternative 5 has now been clarified to indicate that buffers around all wetlands inside timber and livestock emphasis areas will follow a PFC standard, and wetlands outside of timber and livestock priority areas will follow the standards in Alternative 4. These differences are considered in this review.

Terrestrial and Aquatic Species and Habitats — Substantive changes were made to several standards in this section. The standard for snags was refined from the February 1996 version, and the standard for down wood was added. The current snag standard provides additional detail on requirements for snag management, but actually calls for fewer large snags than were specified in February 1996. This revised standard was not intended to provide a lower probability of achieving objectives. Rather, it was based on a more recent review of studies of snag-associated species. The effect of the new minimum standard is incorporated in this review. As with the previous minimum standard, it does not differ across Alternatives 3 through 7, so it was considered in the context of the landscape team's overall assessment of the emphasis, by alternative, on snag management.

The down wood standard represents an addition from the February 1996 standards. However, the terrestrial team had assumed in its 1996 analysis that an appropriate down wood standard would be developed. The specific provisions of this standard are considered in this review.

The standard for maintenance of mature/old forest in Alternatives 3, 4, 5 and 7 is more specific than the standard it replaced from the Terrestrial Team's evaluation materials. The additional specificity is considered in this review.

[2]The Bureau of Land Management produced two technical references for riparian area management on the process for assessing proper functioning condition. These are Technical Report #1737-9 (1993) and #1737-11 (1994).

The standard requiring implementation of recovery plans is stronger than what was in the February 1996 version. However, the terrestrial analysis assumed that recovery plans would be implemented, so this does not result in changed outcomes for terrestrial species.

A variety of other standards were strengthened in this section, including those for management of firewood programs and for maintenance of viable populations. However, these changes have the effect of validating provisions and assumptions that were evaluated by the Terrestrial Team during 1996 and are not considered to affect outcomes in this review.

Human Uses and Values and Tribal Interest — Changes in these areas were judged not to affect habitat outcomes for terrestrial species.

Road Management — Over a dozen objectives and standards for road management changed from the February 1996 evaluation to the current DEIS objectives and standards. These are substantive changes and provide additional guidance on the intent for road management. All changes are, however, consistent with assumptions made by the landscape team in its original projections of road densities under the alternatives. Those projections of road density were the primary basis for the Terrestrial Team's understanding of road effects under each of the alternatives. The new and revised road standards and objectives were considered as part of this review, but their effects were generally similar to original projections.

Adaptive Management/Monitoring and Accountability — Changes in these sections do not result in any changed outcomes for terrestrial plant and animal species.

Allocations from Northwest Forest Plan — At the time of the evaluation in February 1996 there was significant discussion of the likelihood of changing Late-Successional Reserves in the area of overlap between the Columbia River Basin and the Northwest Forest Plan. The understanding now is that standards for management of these reserves might be changed through ecosystem analysis, but that the likelihood of eliminating the reserve designation is very remote. This revised understanding was considered as part of this review.

Effects on Plant and Animal Species

In this section likely changes in species outcomes that result from this more complete understanding of DEIS objectives or standards are discussed. Only those species where some change in outcome is likely will be addressed.

Plants — The number of plants of rangewide conservation concern in the EIS areas is now 173. This slight increase from 164 during the February 1996 evaluation is due to reconciliation of earlier lists of such species and to availability of new field information. Of special note is the discovery of *Spiranthes diluvialis*, a federally listed threatened species, along the Snake River in Idaho in August 1996 (UCRB EIS area). These recently discovered occurrences represent a northwestward range extension for this plant. Since all listed species were analyzed in the initial review, a qualitative analysis of *Spiranthes* is included in this document. The other eight species that surfaced since the 1996 evaluation would all require fine-scale analysis (e.g., they are geographically or ecologically restricted, and can not be evaluated at the broad scale of the analysis).

As in the initial analysis, this evaluation does not include nonvascular plants (lichens, bryophytes and fungi). In addition, it is important to note that this and the previous analysis do not address aquatic vascular plants.

The analysis of effects of the revised alternatives on the continued viability of *Spiranthes diluvialis* applies only to the portion of the plant's range that occurs within the EIS areas. Under Alternatives 3 through 7 the outcome ranking for this plant is 4; habitat in the EIS areas is distributed as isolated patches, with limited dispersal opportunities between patches. The two occurrences of this

plant in the UCRB EIS area are on Federal lands. As there are standards under all of the alternatives that require continued protection of federally listed species and the implementation of recovery plans, this species is not expected to decrease from current levels. This evaluation is not based on the amount of unoccupied suitable habitat available, and the management emphasis for those areas, but rather on the protection afforded to federally listed species by these standards.

The general effect of the majority of the new and revised objectives and standards, as well as a closer consideration of those which were only cursorily examined during the 1996 evaluation, is that they will provide a greater level of protection for all rare plants across the EIS analysis areas. The initial analysis was restricted to those taxa that had a broad geographic distribution pattern, or that occurred in two or more of the broad community groups.

The most significant changes since the review of the alternatives in February 1996 is the strengthening of objectives and standards that apply directly to rare plants and rare plant communities. These additions have significantly strengthened the protection for these elements, especially at the edges of their geographic ranges. Several of these standards may have existed during the review of alternatives in 1996, but were not fully considered during that initial review.

Only one nonvascular plant currently has agency special status within the EIS analysis areas. Since March 1996, a more complete list of rare bryophytes, lichens and fungi in the analysis area has been compiled; these have not yet been reviewed for possible agency special status designation. Furthermore, it is possible that between the release of the draft and final EISs there could be a review of the effects of the alternatives, and specific objectives and standards, on nonvascular plants and aquatic macrophytic vascular plants. There are several standards (such as those for snags, down woody debris in riparian areas, and the aquatic standards for timber and grazing) that could affect the viability of these species. Effects of the objectives and standards on rare plants and rare plant communities are summarized below.

All Rare Plant Species/Communities —

Ecosystem Analysis at the Watershed Scale — In Alternative 6, Ecosystem Analysis at the Watershed Scale is triggered in part by the presence of federal candidate species. Recent changes (Federal Register, Vol. 61, No. 40, p. 7596) were made to the list of species of plants and animals that are regarded as candidates for listing. These changes dropped the earlier classifications of Category 1 (C1) and Category 2 (C2) candidates. For plants in the EIS analysis areas, the changes caused by the reclassification were significant; there was a decrease from 31 C1 and 107 C2 (138 total) to 4 candidate plants. Thus, the number of cases where a rare plant would trigger Ecosystem Analysis at the Watershed Scale would be much lower. There are still 173 plant taxa of rangewide conservation concern which may trigger Ecosystem Analysis at the Watershed Scale in a "may affect" situation. Currently there are five federally listed plants that would trigger Ecosystem Analysis at the Watershed Scale under Alternatives 4 and 6, and Alternative 5 outside timber and livestock priority areas.

Terrestrial Strategies — Though this standard is vague with regard to how it would be implemented, it could be beneficial for habitat restoration and enhancement for rare plants and plant communities under Alternatives 3 through 7.

Aquatic/Riparian Strategies — It is unknown which plant species may be affected by this standard for sand and gravel mining within RCAs, although attainment of RMOs would likely ameliorate any potentially adverse effects.

Terrestrial and Aquatic Species and Habitats/Viable Populations — Regarding rare plant conservation, the most significant objectives and standards that have been strengthened since the initial plant analysis are those in this section. The effect of the implementation of these objectives and standards would be to increase the positive outcomes for all 173 rare plants of rangewide

conservation concern under Alternatives 3 through 6, and for any such species that occur outside of reserves in Alternative 7. Especially important to the conservation of these plants is a standard under Alternatives 3 through 6, and Alternative 7 outside of reserves, which emphasizes the management of those occurrences at the edges of species' ranges. Of the 173 plant taxa of rangewide conservation concern, there are 10 that are considered disjunct or peripheral in the EIS analysis areas, and for these taxa this standard is particularly important. This standard will also provide much needed emphasis on the conservation of peripheral populations of numerous FS and BLM sensitive species that, while they may be secure on a rangewide basis, are rare in certain states or Forest Service Regions.

Standards under Alternatives 3 through 7 would provide critical protection for the continued viability and genetic integrity of rare plants.

Standards for Alternatives 3 through 7 may increase the general level of protection of rare plant communities across the landscape that are dominated by mountain mahogany, bitterbrush or quaking aspen, and for any rare plants occurring in these communities.

Protection/Restoration of Listed Species Habitats — Objectives and standards provide the critical language from BLM and Forest Service manual direction. This direction requires that habitats be managed to prevent the need for listing, to recover special status and sensitive species, and to contribute to the recovery of federally listed species in strict compliance with recovery plans. When implemented, these standards would substantially reduce the difference in effects between the alternatives, as the level of protection is now more clearly stated across the alternatives for all rare plants of conservation concern than it was in the alternatives evaluated in February 1996.

Tribal Interests/Habitat Conditions — Objectives and standards for Alternatives 3 through 7 on tribal plant species of concern were not included in any of the reviews of the alternatives. The vascular plant task group did provide a summary, by vegetation type and seral stage, of the plant taxa of cultural importance that was provided by the SIT liaison working with the Tribes. This objective would raise the level of protection for communities containing these plants during project planning and implementation.

Upland Shrub Species — A spatial analysis has not been conducted to determine which taxa of conservation concern may be affected by restoration and management activities in the range clusters identified as a high priority for livestock forage production under Alternative 5. However, implementing the standards regarding viable populations should result in no decrease in outcomes for plants located in these clusters.

Astragalus mulfordiae, Astragalus oniciformis, Astragalus solitarius, Astragalus yoder-williamsii, Hackelia cronquistii. Under Alternative 6, the requirement for Ecosystem Analysis at the Watershed Scale prior to modification of large blocks of existing native rangelands would potentially provide increased protection of habitat for rare plants and rare plant communities present in these habitats, provided that during the Ecosystem Analysis at the Watershed Scale, rare plants and communities are adequately addressed.

Objectives apply to the management of rangelands under Alternatives 3 through 7, and may afford a greater level of protection for those rare plants associated with range habitats. For the specific locations mentioned a spatial analysis was not completed to determine the specific taxa affected.

Astragalus mulfordiae, Astragalus oniciformis, Astragalus solitarius, Astragalus yoder-williamsii and Penstemon lemhiensis. Given the crucial role of fire in the life cycle of certain rare plants, the restoration of fire as a natural disturbance process under Alternatives 3 through 7 could be beneficial to these species associated with upland shrub communities.

Noxious weeds have been identified as a major threat to rare plants and communities in several

parts of the EIS analysis areas, and implementation of standards potentially increases beneficial outcomes for rare plants threatened by weed invasion, especially for these species associated with upland shrub communities. These potential benefits could result under Alternatives 3 through 6, and under Alternative 7 outside of reserves.

The inclusion of language under Alternatives 3 through 7 that requires the maintenance and restoration of habitat for special status species, in addition to listed, proposed and federal candidate species, greatly increases the potential for positive outcomes for rare plants located in rangeland habitats, especially for these species associated with upland shrub communities.

Forest Species —

Collomia mazama, Cypripedium fasciculatum, Astragalus paysonii, Grindelia howellii, and Penstemon glaucinus. Given the crucial role of fire in the life cycle of certain rare plants, the restoration of fire as a natural disturbance process under Alternatives 3 through 7 could be beneficial to these early and mid-seral forest (or forest opening) species.

Astragalus paysonii, Botrychium ascendens, Botrychium crenulatum, Botrychium paradoxum, Calochortus longebarbatus* var. *longebarbatus, Calochortus longebarbatus* var. *peckii, Calochortus nitidus, Castelleja chlorotica, Collomia mazama, Cypripedium fasciculatum, Grindelia howellii, Mimulus washingtonensis* var. *washingtonensis, Penstemon glaucinus,* and *Penstemon lemhiensis. For these rare plants that occur in forests, or openings in forests, and are potentially threatened by noxious weeds (usually following habitat disturbance), the benefits under Alternatives 3, 5, and 7 (outside of reserves) may not be as great as those under Alternatives 4 and 6, since the last three steps of Integrated Weed Management (IWM) are not required in the case of Alternatives 3, 5, and 7.

Riparian Species — Additional opportunities exist for spatial analysis to determine which of the 173 plants of rangewide conservation concern occur in riparian zones 1, 2a or 2b, and how these would be effected by the types of activities permitted under each alternative in these zones.

Botrychium crenulatum, Calochortus longebarbatus* var. *longebarbatus, and Calochortus longebarbatus var. peckii. In the initial analysis, these three plant species associated with moist forests (or wet meadow openings within forests) were identified as potentially benefitting from the aquatic standards under Alternatives 2, 3, and 7. The adverse effects of Alternatives 4 and 6 on these species may have been slightly overestimated as a result of not fully considering the types and intensities of activities permitted in the buffer zones in these cases.

Amphibians and Reptiles — Some adjustment in outcomes may result for those amphibian and reptilian species associated with riparian ecosystems, because several parts of the aquatic/riparian strategies have been clarified or changed. One potentially positive effect is the use of the slope adjustment factor to delineate RCA zone 2b, managed according to standards for Alternatives 4, 5 (outside timber and livestock emphasis areas) and 6. The change from 100 to 150 foot minimum buffer on intermittent streams for Alternative 7, and the decrease from 100 to 50 foot minimum buffer on ponds and wetlands less than one acre (Alternatives 2, 3, and 7) are the other major differences considered. Because there is no way to quantify the amount of intermittent stream affected by the increase in buffer width in Alternative 7, versus the decrease in small pond and wetland buffer in Alternative 7, these changes are considered to nearly balance each other for species that use both habitats, and result in little or no change under this alternative. Overall, these changes should not result in significant (>0.5 mean outcome units) shifts in species outcomes for amphibians or reptiles.

Coeur d'Alene salamander — The Coeur d'Alene salamander is found in springs, seeps, spray zones and wet talus slopes in forested areas, and does not generally move far from the riparian zones. All of the salamander's range is contained

within the UCRB and about 80 percent of the species' range is on Forest Service land. The riparian zone width around intermittent streams and small wetlands, and the levels of harvest in currently undisturbed forestland were considered the most important attributes of the alternatives on BLM- and FS-administered land. As a result of the fuller understanding of the alternatives, the Coeur d'Alene salamander could have a slightly higher likelihood of Outcome 3 (habitat primarily as patches, limited species interactions, subpopulations interact as a metapopulation) in Alternatives 4 and 6, but would be unlikely to result in a shift of one-half of a mean outcome score. This species' range is primarily (80+ percent) in a timber emphasis area in Alternative 5, so use of the slope adjustment factor to delineate zone 2b will not benefit this species in this alternative. The decrease in buffer on wetlands less than one acre could slightly reduce the outcomes in Alternatives 2 and 3, but again would not result in a change from one outcome level to another. There is no shift in outcomes under Alternatives 1 and 7.

Western toad — Because the riparian buffers were considered important for the western toad, which breeds in spring pools, ponds, lake shallows and slow moving portions of streams, only the decrease in buffer width on small ponds and wetlands (less than one acre) in Alternatives 2 and 3 was evaluated as being germane to this species. The habitat affected by using the slope adjustment factor to define zone 2b would likely be too steep and fast moving to be suitable for this species. The decrease in buffer on wetlands less than one acre could slightly reduce the outcomes in Alternatives 2 and 3, but would not result in a change as large as one-half of a mean outcome score.

Woodhouse's toad — The adjustments in alternatives for Woodhouse's toad would be similar to those for the western toad.

Tailed frog — Tailed frogs occur in isolated populations in and along streams in the Pacific Northwest and are highly specialized for life in cold, clear, fast-flowing mountain streams. Tailed frogs inhabit streams with continuous flow and cold, well-aerated waters and are not found in intermittent streams. Riparian buffers were an important factor in evaluating this species and the use of the slope adjustment factor to define zone 2b would provide some benefit to this species. As a result of the fuller understanding of the alternatives, we believe the tailed frog could have a slightly higher likelihood of Outcome 2 (habitat broadly distributed with gaps with nearly continuous occupation by the species, allowing for the species to interact as a metapopulation) in Alternatives 4 and 6, but would be unlikely to result in a significant change in mean outcome score (a change of at least 0.5 outcome units).

Spotted frogs — The adjustments in alternatives for the "Columbian" spotted frog would be similar to those for the western toad. The adjustments in alternatives for the "Oregon" spotted frog would be similar to those for the western toad.

Northern leopard frog — The adjustment in alternatives for the northern leopard frog would be similar to that for the western toad. It should be noted that any decrease in outcome level for this species in Alternatives 2 and 3 results in higher levels of Outcome 5 (scarce habitat, little or no population interactions, strong potential for extirpations and little likelihood of recolonization).

Painted turtle — The decrease in buffer width on small ponds and wetlands (<1 acre) in Alternatives 2 and 3 was evaluated as being germane to this species, because the riparian buffers were considered important for the painted turtle and because it uses wetlands, ponds and slow moving streams at lower elevations. The habitat affected by using the slope adjustment factor to define zone 2b would likely be too steep and fast moving to be suitable for this species. The decrease in buffer on wetlands less than 1 acre could slightly reduce the outcomes in Alternatives 2 and 3, but would not result in a significant change in outcome score.

Western pond turtle — The adjustments in alternatives for the western pond turtle would be similar to those for the painted turtle.

Rubber boa — Similar adjustment to painted turtle.

Common garter snake — Similar adjustment to painted turtle.

Waterbirds and Shorebirds — Changes in the aquatic standards from the February 1996 version are the only changes that potentially will affect viability outcomes for waterbirds and shorebirds.

Reduction in the buffer zone for small (<1 ac) wetlands likely would lower the outcome scores for some species groups under Alternatives 2, 3, and 7. The reduction in outcome, however, would probably not be significant. The effect of reducing this buffer likely will reduce the amount and quality of riparian and adjacent upland vegetation and water quality in small wetlands. Implementation of a 100 foot buffer zone (previously PFC was the standard) in emphasis areas other than timber and livestock under Alternative 5 likely would have a positive effect on outcomes scores for some species groups. Increasing the RCA on intermittent streams (from 100' to 150') under Alt. 7 will have a minor positive effect on some species viability outcomes through increased water quality in the larger perennial streams.

The addition of a slope adjustment factor, potentially increasing the width of forest riparian conservation areas in Alternatives 4, 5 (outside timber and livestock emphasis areas), and 6 will have a positive effect on viability outcomes for some species groups of waterbirds and shorebirds. The effect on viability outcomes likely would be small, and probably not significant, for most species because the slope adjustment would occur on small perennial or intermittent streams that are secondary habitats for stream or riparian associated species. However, the greater protection for those lower order streams will have a positive influence in downstream water quality in the larger higher-order streams. The effect would be relatively smaller under Alternative 5 than under Alternatives 4 or 6, because the standards would not affect timber or livestock emphasis areas in Alternative 5.

Group 1: Open water species — Lower outcomes from reduction in small wetland buffers that would affect adjacent vegetation and water quality under Alternatives 2, 3, and 7.

Group 3: Wood duck, common and hooded mergansers — Higher outcomes by increasing forest RCA width and resulting increase in water quality under Alternatives 4, 5, and 6. However, reducing small wetland buffers might reduce nesting snag availability and result in a slight reduction outcome under Alternatives 2, 3, and 7.

Group 4: Common and barrow's goldeneye, bufflehead — Lower outcome scores from reduction in small wetland buffers that might lower availability of nesting snags under Alternatives 2, 3, and 7.

Group 6: Harlequin duck — Higher outcome scores from increasing forest RCA widths and resulting increases in water quality, lower disturbance near streams under Alternatives 4, 5, and 6. Changes would likely have little affect on streamside habitat.

Group 7: Herons and egrets — Lower outcome scores from reduction in small wetland buffers and consequent effects on adjacent vegetation and water quality, and reduction in availability of nesting trees near wetlands under Alternatives 2, 3, and 7.

Group 8: Dabbling ducks — Lower outcome scores from reduction in small wetland buffers and consequent effects on water quality and adjacent vegetation used for nesting under Alternatives 2, 3, and 7.

Raptors and Gamebirds — The raptors and gamebirds reviewed by the Terrestrial Team use essentially all habitats in the assessment area. For most of these habitats, little change in outcome is projected to result from changes to alternatives or changes in understanding of the alternatives made between February 1996 and February 1997. The

habitats for which different projections might actually be made are those associated with riparian and wetland areas. Several of the raptor and gamebird species are associated with these habitats. These include blue grouse, mountain quail, bald eagle, Swainson's hawk, merlin, long-eared owl, northern pygmy-owl, northern saw-whet owl, and western screech owl.

Of the raptors and gamebirds associated with riparian habitats, 6 are associated with riparian shrub or herb vegetation. These habitats are not strongly influenced by the refined understanding of the aquatic/riparian strategies, so outcomes for the 6 species (mountain quail, Swainson' hawk, merlin, northern pygmy-owl, and northern saw-whet owl) are not expected to be influenced by refined understanding of the alternatives.

Long-eared & western screech owls — Two species, long-eared owl and western screech owl, are associated with riparian willow and cottonwood. This habitat would probably be somewhat benefited by the 150 foot buffers on intermittent streams that we now understand to be the standard for Alternative 7. Outcomes for these species under Alternative 7 would likely be somewhat better than projected in February 1996, but not significantly so. The slope adjustment factor applied to Alternatives 4, 5, and 6 to delineate zone 2b is less likely to include these riparian types, so no improvement for these species is projected under Alternatives 4, 5 and 6.

Bald eagle — One species, bald eagle, is associated with large conifer trees near water. This habitat is likely to receive some greater protection within zone 2b of Alternatives 4, 5, and 6 than was projected in February 1996. This difference is not expected to be significant, and would be less in Alternative 5 than in Alternatives 4 and 6 since this riparian standard does not apply within the Timber Emphasis Areas. Since Alternatives 4 and 6 were previously judged to have the best outcomes for bald eagles, these changes do not have a strong effect.

Blue grouse — Blue grouse are associated with riparian woodland which is likely also represented within zone 2b. Outcomes for blue grouse would likely be somewhat better under Alternatives 4, 5, and 6 than was projected in February, 1996. Again, this change would not be significantly large, and the change would be less under Alternative 5 than Alternatives 4 and 6. Since these alternatives were already projected to improve blue grouse habitat, these small changes would do little to influence effects associated with the alternatives.

Woodpeckers, Nuthatches and Swifts — Cavity-nesting birds are influenced by fine-scale features of the environment, especially numbers of snags. Revised guidelines may lead to a short-term decline in numbers of large snags relative to the understanding at the time the expert panels were convened. However, new research suggests the original understandings of snag requirements were higher than necessary. In the long term, no significant changes in outcome scores are expected for cavity-nesting species.

Pileated Woodpecker — Revised snag guidelines call for interim standards that would remain in place until locally developed standards are adopted. The revised standard for large (> 20 inch dbh) snags is lower than considered in the previous analysis. These revised guidelines resulted from a new literature review and summary of snag requirements of cavity-nesting species, and these standards provide for 6 to 10 times the density of large snags than existing direction (Thomas and others 1979[3]) so the new guidelines are presumed to be sufficient to meet the needs of these species. In addition, the expert panel was primarily influenced by the long term projection of snag emphasis under each alternative rather than the interim guidance. Any influence of these new guidelines

[3]Thomas, Jack W. ed. 1979. Wildlife habitats in managed forests. The Blue Mountains of Oregon and Washington. Forest Service Agric. Handbook. 553. U.S. Department of Agriculture, Forest Service. 512 p.

would probably be most important over the shorter term, say the next few decades until local standards are developed. Over the long run, the outcome scores would not change for this species. If one accepts that the original interim guidelines were more appropriate to meet nesting requirements for the species, the result would be a slight decline in outcome scores under Alternatives 3 through 7 (certainly less than one-half of a full outcome level).

White-headed Woodpecker — Same as pileated woodpecker.

Vaux's Swift — Same as pileated woodpecker.

Note: For each of these species, the new guidelines call for retention of large patches and connectivity of mature forest under Alternatives 3, 4, 5, and 7 (outside reserves). This could lead to greater numbers of large snags. However, the landscape team did not project greater expression of late-seral conditions over the long term, so it is difficult to determine whether changes in habitat outcome would be realized.

Lewis' Woodpecker — The February 1997 riparian standards indicate that riparian buffer widths in Alternatives 4, 6, and 5 (in areas outside of timber or livestock emphasis) are larger than originally evaluated. Lewis' woodpeckers nest primarily in cottonwoods along permanently flowing streams at lower elevations. Because the effects of the revised aquatic standards would be most pronounced for higher elevation intermittent streams, the outcome scores for this species would slightly increase, but not to more than one-half of an outcome level. The only significant increase in RCA would be in areas outside of timber and livestock emphasis under Alternative 5 and these areas represent a small proportion of the species' range in the EIS areas. Therefore, the outcome score for Alternative 5 would not be raised.

Other cavity-nesting species — Other species of cavity-nesting birds are associated with smaller diameter snags. Guidelines for retention of smaller snags are similar to those presented during the panel deliberations and do not warrant changes in outcome scores for any of these other species.

Cuckoos, Hummingbirds, and Passerines — Based on the analysis of the implications of new or revised standards under the planning alternatives, no changes in outcome scores are warranted for cuckoos, hummingbirds, and passerines. Reasons for these findings are discussed below.

Riparian species — The species associated with riparian habitats would benefit from somewhat larger riparian buffers based on the guidelines due to the slope adjustment factor applied to Alternatives 4, 5 (outside of timber and livestock emphasis areas), and 6. The effect would be greatest on intermittent streams on steeper slopes that occur in higher elevation landscapes. Therefore, species that occur in riparian habitats associated with higher elevation coniferous forest would probably benefit most from this change. The species classified as riparian associates in this analysis are more typically in lower elevation hardwood and shrub habitats, so the benefit from the revised guidelines would be very slight.

Forest species —

Hammond's Flycatcher. This species is associated with late-seral coniferous forest. The revised standards call for retention of large connected blocks of late-seral forest under Alternatives 3, 4, 5 and 7 (outside of reserves), which could create better habitat conditions for this species. However, the Landscape Team did not project increased expression of late-seral forest over the long run as a result. Therefore, although one might expect a slightly increased habitat outcome under these alternatives, this was not reflected in the landscape projections. Given the long-term landscape projections, there is not sufficient evidence to support revising the outcome scores for this species.

Winter Wren. See narrative for Hammond's flycatcher. In addition, this species is associated with down wood. The revised standards provide more specific down wood guidelines than were available at the time of the panel deliberations. These standards would provide for slightly greater retention of down wood under Alternatives 4 and 6 than

under other alternatives until local guidelines are developed. This is consistent with the original interpretations, and consistent with the level of emphasis on down wood as provided by the Landscape Team. Therefore, no change is expected in habitat outcome scores for this species.

Grassland species — No expected changes.

Woodland species — No expected changes.

Bats and Small Mammals — Some adjustment in outcomes may result for those bats and small mammals associated with riparian ecosystems and snag habitat, because some aquatic/riparian strategies and snag requirements have been clarified or changed. The use of the slope adjustment factor (riparian zone 2b) in standards for Alternatives 4, 5 (outside timber and livestock emphasis areas) and 6, the change from 100- to 150-foot minimum buffer on intermittent streams for Alternative 7, and the decrease from a 100- to a 50-foot minimum buffer on ponds and wetlands less than 1 acre (Alternatives 2, 3, and 7) are the major riparian differences considered. Because there is no way to quantify the amount of intermittent stream affected by the increase in buffer width in Alternative 7, versus the decrease in small pond and wetland buffer in Alternative 7, these changes were considered to balance or nearly balance each other for species that use both habitats, and result in little or no change under this Alternative.

Cavity-roosting bats and small mammals are influenced by the numbers of snags available. The revised guidelines may result in fewer large snags than understood at the time the expert panels were convened. New research summaries suggest the current snag requirements are adequate to meet species needs for this habitat component. In the long term, no significant changes in outcome scores are expected for these cavity-roosting bats and small mammals.

A new standard calls for retention of large patches and connectivity of late-seral forest under Alternatives 3, 4, 5 and 7 (outside reserves). This could lead to greater numbers of large snags and green trees and more contiguous, sizeable patches of late-seral forest. Because the landscape team did not project more late-seral conditions over the long term it is difficult to assess whether changes in habitat outcomes would occur.

Bats — The fringed myotis, hoary bat, long-eared bat, long-legged bat, silver-haired bat, and spotted bat all use snags and live tree roosts, late-seral habitat, and riparian habitat. They are also sensitive to human disturbance. The initial panel judgments were, therefore, based on projected large snag numbers, amounts of late-seral habitat, timber harvest levels, levels of human disturbance, and riparian buffers. Because of the clarification of the aquatic/riparian standards, Alternatives 4, 5 (outside timber and livestock emphasis areas), and 6 should result in wider riparian buffers on intermittent streams in steep landscapes than understood in the initial panels. Alternative 7 has wider buffers on all intermittent streams. Alternatives 2, 3, and 7 should result in smaller riparian buffers on ponds and wetlands smaller than 1 acre. Because there is no way to quantify the amount of intermittent stream affected by the increase in buffer width in Alternative 7, versus the decrease in small pond and wetland buffer in Alternative 7, these changes were considered to generally balance each other for species that use both habitats, and result in little or no change under this Alternative. Alternatives 4 and 6 could have slightly better outcomes than earlier projected for these species, while Alternatives 2 and 3 could have slightly lower outcomes. Overall these changes should not result in significant shifts in species outcomes (such as a shift in one-half a species mean likelihood outcome) for any bats or small mammals assessed.

Similarly, the adjustment in large snag guidelines and clarification of standards for retention of large patches and connectivity of late-seral forest [Alternatives 3, 4, 5 and 7 (outside reserves)] should not result in significant shifts in species outcomes (such as a shift in one-half a species mean likelihood outcome) for any bats or small mammals assessed.

For pale western big-eared bat the number of large diameter snags, riparian condition, and intermittent stream protections, and the reduction of road densities were important features of the alternatives. Expected results of clarifications or changes in Alternatives are similar to those described for other bats, above.

__Small mammals__ — Important components of northern flying squirrel habitat include large trees and snags. Improving riparian conditions and decreasing forest fragmentation are also important. Expected results of clarifications or changes in Alternatives are similar to those described for the bats, above.

Carnivores — In general the revised objectives and standards, as they relate to the carnivores considered for analysis, have positive implications for the group. Although numerous changes have been made to the standards and objectives, 15 of the changes were considered to be of importance to the carnivore species group. Each of the selected changes to the objectives and standards were rated as positive (+), neutral (/), or negative (-) for each species in the group. Overall trends were then determined from the change for each alternative, for each species and the group as a whole.

The triggers for ecosystem analysis at the watershed scale are positive for carnivores, in that several species are federally listed, all of the species considered persist in areas of low road densities and several species prey on range associated species. An additional standard for Alternatives 3 through 7 is considered to be positive for grizzly bears. This standard affords additional protection for whitebark pine.

Two changes in aquatic and riparian standards have implications for this group. First, for Alternative 7 the panelists originally evaluated buffer widths of 100 feet for intermittent streams, the current standard reads 150 feet. For the species in this group this can be considered a positive change. Second, however is the decrease in the buffer width from 100 feet to 50 feet around small wetlands (less than 1 acre in size) under Alternatives 2, 3, and 7, for watersheds not identified as key or priority. This change is considered to have a negative effect on the habitat of most carnivore species and their prey. The addition of the slope adjustment factor for Alternatives 4, 5 (outside timber priority areas) and 6 are considered positive for carnivores. This change allows for improved prey habitat and improved dispersal habitat.

The changes involving the standards for coarse woody debris, large standing trees (live or dead), snags and down wood for Alternatives 3 through 7 are considered to be neutral for forest carnivores at this time, with the understanding that the prescribed levels meet the habitat requirements of these species and their prey.

Projected road densities were considered a very important aspect in rating the viability outcomes for the alternatives. The current road density reduction standard in Alternatives 3 through 7 and the standard that limits increasing road densities in areas that currently have no roads to a low road density, for Alternatives 3 through 7, are consistent with the maps the panelists were given during the alternative evaluation process. Therefore this is considered to be a clarification of intent and not a change in content.

__Forest carnivores: pine marten, fisher, lynx and wolverine__ — Of all the changes to the objectives and standards of greatest concern for pine marten and fisher are the standards for coarse woody debris, large standing trees, snags and down wood. Specifically the changes to the snag standards require fewer large snags and an increased number of total snags. The assumption is that these changes will meet the habitat requirements of forest carnivores and their prey. The change to aquatic and riparian direction for Alternative 7 which increased the buffer width on intermittent streams and the slope adjustment factor, should be positive for forest carnivores. The last change potentially affecting habitat for this group, involves the standards for road densities. One standard which requires ecosystem analysis at the watershed scale (in areas of no or low road density), can be considered positive for forest carnivores. The standard which requires decreasing

road densities in areas of high or extreme road density is also considered to be positive for forest carnivores.

Alternative	Expected Change in Outcomes
1,2,3,4,5	No change
6	Slight improvement
7	More improvement

Gray Wolf — The implications for the gray wolf as a result of the changes to the objectives and standards are fairly limited. The requirements for ecosystem analysis at the watershed scale for Alternatives 4, 6 and parts of 5, will be positive for gray wolf. The only other change expected to affect gray wolf habitat is one which prescribes reducing road densities in areas of high or extreme road densities.

Alternative	Expected Change in Outcomes
1,2,3,4,5	No change
6,7	Slight improvement

Grizzly bear — The changes to the Aquatic Conservation Strategy previously described have mixed results for grizzly bears. Increasing the buffer widths on intermittent streams (Alternative 7) and the slope adjustment factor for Zone 2B (Alternatives 4, 6 and parts of 5), will have a beneficial effect on grizzly bear habitat. Potentially these changes could benefit movement corridors and prey habitat. The decrease in the size of the buffers for wetlands less than 1 acre would have a negative effect on grizzly bear habitat. Both standards were rated positive for grizzly bears. The standard which calls for increasing the distribution and frequency of whitebark pine for Alternatives 3 through 7 could be very positive for grizzly bears. The standard which prescribes road density reductions in areas of high to extreme road densities may have some potential benefit for grizzly bear habitat.

Alternative	Expected Change in Outcomes
1,2,3,5	No change
4, 6	Slight improvement
7	More improvement

Ungulates — Since the woodland caribou uses habitats quite different from the pronghorn antelope and the California bighorn sheep it is impossible to determine trends in expected effects as a result of the changed objective and standards for the ungulates as a group. However expected effects for pronghorn antelope and California bighorn sheep are similar.

Woodland caribou — Generally the changes to the objectives and standards are expected to be positive for the woodland caribou. The only negative effect expected involves the Aquatic Conservation Strategy where the buffer widths on wetlands less than 1 acre in size are understood to have decreased from 100-foot to 50-foot (Alternatives 2, 3 and 7). However, the increase in buffer widths along intermittent streams (Alternative 7) and the slope adjustment factor (Alternatives 4, 6 and parts of 5) are considered a positive change for caribou habitats. Requirements for ecosystem analysis at the watershed scale (listed species, Alternatives 4 through 7) and areas of no or low road density (Alternatives 6 and 7), are considered to be positive for woodland caribou habitats. Standards calling for large standing trees (Alternatives 3 through 7) and restricting the harvest of large trees (Alternative 7), are considered favorable for woodland caribou. Finally, the standard which prescribes reducing road densities in area of high and extreme road density (Alternatives 3 through 7) is considered positive for woodland caribou.

Alternative	Expected Change in Outcomes
1,2,3,4,5,6	No change
7	More improvement

Pronghorn antelope and California bighorn sheep — The expected overall effects of the changes to the objectives and standards for pronghorn antelope and California bighorn sheep are minimal. Potentially three standards are considered to be positive for these two species. These standards prescribe ecosystem analysis at the watershed scale for areas of no to low road densities and areas which contain large block of native rangelands, and will be positive for both species.

Finally the standard which prescribes a decrease in road densities in areas that currently have high to extreme road densities, is considered to be positive for these 2 species (Alternatives 3 through 7).

Alternative	Expected Change in Outcomes
1,2,3,4,5,6	No change
7	Slight improvement

Significance of Changes

Standards to better establish the priorities for accomplishing subbasin reviews and Ecosystem Analysis at the Watershed Scale would provide for better protection of some rare plants and some carnivores. Outcomes for plants of special or sensitive status would be more positive because of the improved emphasis on protection and restoration of habitats. These changes have significantly strengthened the protection for plants at the edges of their geographic ranges.

Changes primarily in the delineation of RCAs and the snag and down wood standards most affected vertebrate species outcomes initially determined during February 1996. Increasing the RCA width by addition of the slope adjustment factor in Alternatives 4, 5 (outside timber and livestock emphasis areas), and 6 would have beneficial effects on some riparian-associated species. However, the revised standard would primarily affect intermittent streams and would have less direct impact than with perennial streams, which provide more primary riparian habitat than intermittent streams. The effects on downstream water quality in the higher order perennial streams would have a positive impact on species associated with aquatic habitats. These positive effects on riparian species would be much smaller under Alternative 5, where they would occur only in emphasis areas other than timber and livestock, than under Alternatives 4 and 6. Increasing the buffer zone in intermittent streams under Alternative 7 would have indirect effects similar to increasing RCA widths under Alternatives 4 and 6.

Decreasing the buffer zones in small wetlands (<1 acre) under Alternatives 2, 3 and 7 from 100 feet to 50 feet would have some negative effects on species associated with those habitats. In some cases, such as with amphibians, the effects of wider RCAs in intermittent streams, as described above, might be offset by decreases in small wetland protection. However, protection of small wetlands in priority areas other than timber or livestock would result in better habitat outcomes for species in those habitats under Alternative 5.

Changes in the snag and down wood retention levels would likely not change the outcomes determined during February 1996 for species associated with those habitat elements. Although the current standards call for lower retention of large snags than the February 1996 evaluation, new research suggests the original understandings of snag requirements were higher than necessary. In the long term, no significant changes in outcome scores are expected for species associated with snag or down wood habitats.

Overall, changes in the alternatives from 1996 to 1997 will not result in significant changes in mean viability outcome scores (that is, changes would be less than 0.5 outcome units) for species affected by changes.

Social-Economic

Richard W. Haynes, Amy L. Horne, James A. Burchfield, and Steve F. McCool[4]

Major Changes that Occurred in Standards and Objectives

The primary changes in the DEIS alternatives that will affect the evaluation are those changes that increase the likelihood of protracted planning activities in the first decade. This includes ecosystem analysis at the watershed scale and subbasin reviews. Such activities reduce the likelihood of attaining the first decade activity levels until later in the decade. This could especially be a problem

[4]The authors benefited from discussions with Nick Reyna and Stewart Allen.

for the timber activity levels where timber sale activity is expected to drop while watershed analysis is undertaken.

Types of Changes

The alternatives differ only in the extent of the potential drop in timber sale activity. Those delays in the sales program on top of the changes in, for example, the timber sale program since 1990, will impose further economic impacts over the next five years. For example, in the Eastside EIS area the timber sale program fell from 1.6 billion board feet in 1990 to 316 million board feet in 1995 largely as the result of the Eastside Screens and changes in the FS timber sale program. For the Eastside DEIS, average first decade harvests in Alternatives 2 through 6 average 767 million board feet — more than two times current sales level. Assuming that during the period when watershed analyses are conducted the timber sales program remains at current levels and that only one tenth[5] of the harvest reduction can be offset by increases on private timber lands, then job reductions will be increased by 3,100 jobs during that period. This timber is sufficient to supply 12 mills. While it is difficult to predict specific mill closures, mill closures will be inevitable during this period. The problem is not as severe in the UCRB where Federal timber sales have fallen by a smaller percentage only in the last three years.

While these changes are framed in just economic terms, the social changes that accompany these economic transitions are very real in those communities experiencing mill closures. Communities and economies characterized by low social/economic resiliency will be challenged during this transition period from existing FS practices to the new practices reflecting ecosystem management. Various institutions such as local governments will attempt to prevent or mitigate these changes, possibly threatening achievement of the long-term management changes.

Not addressed are the substantial costs to the various agencies for additional planning activities. In an era of downsizing and reduced federal budgets, such an approach seems regressive. Management delays in accomplishing watershed analysis (up to four years in some alternatives) may diminish public confidence in the agencies responsible for the stewardship of Federal lands. It may betray the presumed promises offered by the EISs as a more efficient planning model to guide actions on Federal lands and would likely engender a negative political response. Finally, there is the likely decrease in trust in Federal land management agencies as effective institutions capable of coordinated action.

The potential decrease in federal payments to counties coupled with decreases in federal dollars to support road systems on Federal lands will impact both social resiliency and recreation opportunities that contribute to local quality of life. These decreases are relatively certain compared to the relatively uncertain and longer-term projections of positive effects on fish and environmental quality. It is difficult to speculate on the effect of other social variables such as quality of life or community well-being.

Significance of Changes

The primary changes in the DEIS alternatives, standards and guidelines that affected the evaluation are those changes that increase the likelihood of protracted planning activities in the first decade. This conclusion is reached by looking at the extent of the reliance in the various DEIS alternatives on new planning activities prior to the implementation of land management activities such as timber sales. This is seen as having the largest impact on the timber sales program and payments to counties while only minimal impacts on recreation or range activities.

[5]Past studies have used a higher fraction but the length of the current federal harvest reduction (now six years) has reduced the available private timber inventories.

Conclusions

Thomas M. Quigley

The concurrent scientific assessment and EIS development complicated the evaluation of the DEIS alternative effects. The SIT retained the February 1996 version as the primary product to analyze so that analysis could be concluded. The primary overarching elements of the alternatives (purpose and need, goals, themes, activity levels, desired range of future conditions, and the affected environment) changed very little between February 1996 and February 1997. Those elements that changed the most were the objectives and standards. For the most part changes were to improve understanding, provide clarity, and further flesh out details associated with process-oriented standards. These were generally adopted in a manner consistent with the SIT assumptions required to resolve unknowns in the February 1996 EISs.

Given this background one would not expect dramatic differences in effects and consequences, nor to see rankings among the alternatives shift substantially. This is essentially the outcome of the re-revaluation of the February 1997 version of the DEISs. Many of the objectives and standards were at scales and resolutions that could not be modeled directly across the EIS areas. This resulted in interpretations of likely effects for many of the new standards and objectives.

On the whole, changes to the alternatives will improve overall conditions for riparian and aquatic related species. Projecting future effects to 100 years results in few substantive differences. From a landscape ecology perspective, the changes in the alternatives are likely to delay the transition to the desired future conditions during the first decade. In addition the single size/state standards will likely increase disruption of ecological processes if they are not revised to fit the ground during implementation within the first decade.

Alternatives 3 through 7 provide varying rates in achieving healthy landscapes, but each has some potential. The requirements for subbasin review and ecosystem analysis at the watershed scale are likely to cause a slowdown in the production of timber during the first few years. The social and political acceptability for the required analysis and its potential impact on commodity flows are first decade concerns for managers. Terrestrial species are expected to have slightly better outcomes associated with the revised alternatives, but few changes would be significant (that is, changes would be less than 0.5 outcome units).

The SIT has worked with the EIS teams as the assessment and EISs were developed. The EIS teams relied heavily on the Evaluation of EIS Alternatives by the SIT. Rather than continue to modify the science publication to remain completely consistent with the evolving EISs, chapters 2 through 7 of this publication are based on the February 1996 version. This chapter provides a brief overview of the changes in the evaluation of alternatives that are reflected in the February 1997 DEISs. To understand the specific management directions being considered within the EIS process and the associated effects and consequences, refer directly to the official NEPA documents.

Acknowledgments

The re-evaluation of the EIS alternatives was accomplished in a short period of time to accommodate continued progress of the EIS process. Many individuals contributed to the re-evaluation and its documentation. Cindy Dean has been largely responsible for the synthesis and final collating of the information. Rebecca Gravenmier assisted in organizing and interpreting the voluminous information. Jodi Clifford has assisted in editing and general document coordination. Cathy Humphrey and Shari Whitwell provided valuable summaries and comparisons of standards and objectives between EIS versions. The Project administrative staff and communications teams aided in many ways during periods of quick turnaround requirements and under high pressure. Ralph Perkins and Richard Hanes provided valuable insights into tribal concerns.

Appendix I

The science team received the Preliminary Draft EIS standards and objectives in February 1996. This appendix is provided as a reference listing of those standards and objectives. They represent the set for which the science team analyzed and documented the outcomes and effects. As the analysis proceeded and interaction occurred with managers, the public, and the Science Team, these original standards and objectives began to evolve. For a listing of the specific objectives and standards in which this process finally resulted, please refer to the EIS documents directly.

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Direction for Alternative 1

Objectives and Standards

Implementation and Adaptive Management

1I-O1. For riparian areas, measurable objectives and monitoring will be set for key parameters such as stream surface shading, streambank stability and shrub cover.

Monitoring and Evaluation

1M-S1. Ensure operations are in compliance with appropriate regulations. Conduct inspections in accordance with agency policies and procedures.

Physical Environment

1P-O2. Meet state air quality requirements.

1P-S2. Plan and conduct prescribed burning in accordance with State Smoke Management Plans and State Implementation Plans of the Clean Air Act.

Suggested Technique
Employ smoke management mitigation measures to reduce emissions from prescribed burning.

1P-S3. Reduce total emissions from prescribed burns to prevent significant deterioration (PSD).

Suggested Technique
Reduce the potential for wildfire emissions through use of prescribed fire and other fuels management.

1F-O3. Plan and conduct land uses and management activities to minimize loss of site potential caused by detrimental erosion, compaction, displacement, puddling and severe burning.

1F-O4. Maintain at least 80% of each activity area in condition of acceptable productivity potential.

1F-O5. Use management practices that ensure:

- Adequate amounts of ground cover to support infiltration, maintain soil moisture storage and stabilize soils.
- Permeability rates appropriate to climate and soils.
- Adequate nutrient capital and functioning cycles on all lands.

1F-O6. Where detrimental effects have occurred, plan and implement rehabilitation to meet soil and water objectives and standards.

1F-O7. Stabilize lands disturbed as a result of activities to control soil erosion.

1P-O8. Maintain or enhance water quality and quantity and protect existing beneficial uses of water.

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1P-S4. Meet or exceed applicable state and federal water quality standards.

Human Uses and Values

1H-O4. Provide a broad spectrum of developed and dispersed recreation opportunities and activities in a range of settings.

1H-S4. Use the recreation opportunity spectrum (ROS) or appropriate agency direction to guide inventory and management to meet goals for recreation settings and experiences.

1H-S5. Manage recreation settings and facilities to provide safe and sanitary recreation experiences, protect facilities, sites and resources, and meet user needs.

1H-S6. Protect and manage established dispersed recreation sties and special place.

1H-O5. Maintain and enhance the visual character of the landscape.

1H-S7. Meet established visual quality objectives (or "higher"), using management principles and techniques from the appropriate agency Landscape Management Systems.

Suggested Technique
Rehabilitate landscapes containing negative visual elements.

1H-O6. Coordinate management of Federal lands, resources and activities with local, state and Federal agencies, private landowners, Native American Tribes, and interest and user groups. [from 3-7?]

Suggested Techniques
Emphasize strengthening and developing partnerships in managing and enhancing Forest resources (fish, wildlife, recreation, others).

Coordinate fire management activities in rural interface areas with local governments, agencies, and landowners.

1H-O7. Improve public awareness of, involvement in, and support for Forest and District land management objectives and programs.

1H-O8. Support strategies that enhance rural community economic advancement; define complimentary roles and implement programs that best serve the public. Assist in providing developmental, tourism, and recreational activities that help diversify rural economies, improve quality of life that attracts amenity related in-migration.

1H-S8. Provide a predictable supply of timber and other forest products within sustainable limits of the ecosystem(s).

1H-S9. Provide a predictable supply of livestock and wild horse forage within sustainable limits of the ecosystem.

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1H-O9. Provide for ceded land rights and treaty privileges of native peoples. [should we have items from 3-7 here also?]

1H-O10. Consult and coordinate planning and management activities with the tribes.

1H- O11. Maintain pubic lands open to and available for mineral and energy exploration and development except where legally unavailable (withdrawn) or necessary to protect special values.

Locatable Minerals

Objective. Provide opportunity for the orderly exploration and development of mineral resources in area identified as open to operations and subject to appropriate regulations.

1H-S10. As required by applicable mining laws, provide access for exploration and development of locatable mineral resources. A decision on approval of access will be made as a result of appropriate environmental analysis, conducted in response to proposed operating plans.

1H-S11. Where necessary to protect important lands and resources, mineral exploration and development would be subject to additional restrictions or stipulations. The least restrictive limitations necessary for resource protection would be used.

1H-S12. All surface disturbance from operations would be reclaimed to a productive condition to the extent reasonable and practicable.

Leasable Minerals

Objective. Provide leasing opportunities for oil, gas and geothermal exploration and development subject to appropriate regulations and requirements in areas identified as open to operations.

Standard. Subject to applicable laws and regulations, provide access for exploration and development of leasable mineral resources.

Standard. All exploration applications will receive appropriate environmental review and NEPA documentation prior to authorization.

Standard. In order to protect special resource values and investments, leasing would be subject to appropriate lease notices and lease stipulations.

Standard. Ensure that operations are in compliance with appropriate regulations conducted inspections in accordance with agency policies and procedures.

Standard. All surface disturbance from operations would be reclaimed to a productive condition to the extent reasonable and practicable.

Objective. Provide and manage a safe and economical transportation system to provide public access and meet resource and protection objectives.

Standard. Plan, develop, operate, and maintain according to agency standards and objectives for planned uses and activities, safety, economies, and impacts on lands and resources.

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Terrestrial Ecosystems

1T-O12. Make suitable rangelands available for grazing and browse use in coordination with other uses and protecting productivity.

1T-S13. Allocate forage on allotment or management area to meet basic plant, plant vigor, and soil needs as first priority.

1T-S13a. Use the forage utilization standards defined in agency guides; use levels should be consistent with objectives established by management plans.

Suggested Technique
Set forage utilization standards (stocking rates) for livestock, wild horses and burros, and big game for riparian and upland areas based on species type, current allotment condition and range management strategy.

Design grazing systems to maintain or improve plant vigor.

1T-S14. Range project plans or AMPs and, where applicable, wild horse and burro herd management plans (WHHMPs) will be developed, revised and maintained which establish objectives for managing vegetation resources (including activities needed to achieve the objectives) for achieving desirable riparian conditions (and improvement schedule if needed, grazing system, season of use, class of livestock, stocking levels, forage products and utilization rates, improvements needed to achieve objectives, economic efficiency analysis and coordinating requirements).

Suggested Technique
Intensive range management practices including rest may be used to protect and improve riparian vegetation and fish and wildlife habitats.

To stabilize soils, improve livestock forage conditions and wildlife habitat, seed poor condition rangelands to a site specific mixture of native or desirable exotic grasses, fobs and shrubs. Use seedings to release grazing pressure form native range to improve their condition.

To stabilize soils after wildfire, seed rangelands that have a low potential for natural recovery with a site specific mixture of native or desirable exotic grasses, forbs and shrubs.

Provide periods of rest from disturbance or livestock use during times of critical plant growth to maintain or improve vegetation condition.

1T-O13. Use integrated pest management detection, prevention, and suppression strategies to manage pests including biological, manual, mechanical, cultural, prescribed fire, chemical and regulatory methods.

1T-S15. Plans and actions for control of competing and unwanted vegetation (including noxious weeds) will be in keeping with "Managing Competing and Unwanted Vegetation" (FEDS) USDA, Forest Service, 1988, "Vegetation Treatment on BLM Lands in Thirteen Western States" (ROD) USDA, BLM 1991., "Northwest Area Noxious Weed Control Program" (ROD) USDI BLM 1987, or similar agency direction.

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1T-S16. All wild fires shall receive a prompt and appropriate suppression response. Appropriate suppression strategies are defined by the agency.

1T-S17. Priorities for fire suppression shall be the protection of human life, public safety, private property, and improvements or investments.

Suggested Techniques
Use minimum impact suppression methods.

Use prescribed fire to meet vegetation management objectives and to reduce and maintain appropriate fuel profiles. Unplanned ignition may be used if a prescribed fire plan has been developed and the fire is within prescription.

Manage residue profiles at a level to minimize the potential of high intensity catastrophic wildfire and provide for other resource objectives.

1T- O14. [need an obj related to suitable lands: see 1T-O12 for example.]

1F-S18. Allow regulated timber harvest only on lands classified as suitable for timber management. Prohibited timber harvest on lands unsuitable for timber management, except where needed to accomplish other multiple use objectives.

1F-S19. Selection of appropriate silvicultural systems should be guided by:

- Meets the management objectives and management area or resource emphasis.
- Permits the production of a volume of marketable trees sufficient to utilize all trees that meet utilization standards defined in agency guidelines and are designated for harvest.
- Permits the use of acceptable logging methods that can remove logs and other products without excessive damage to the identified desirable retained vegetation.
- Be capable of meeting or providing special management conditions and achieve particular multiple use management objectives (such as streamside protection, wildlife needs, and visual enhancement).
- Permits control vegetation and use appropriate practices to establish desired species, composition, density and rates of growth of trees and other vegetation needed to achieve objectives.
- Promote stand structures and species composition that minimizes serious risk of damage caused by mammals, insects, disease, or wildfire, and allows treatment of existing insect, disease, or fuel conditions.
- Assure that lands can be adequately restocked within time frames.
- Practical and economic in terms of transportation, harvesting, preparation and administration of timber sales.

1F-S19a. Clearcutting should only be allowed when it is found to be the optimum harvest methods.

Suggested Technique
The variety of management intensities and silvicultural practices can be used, singly or in combination, and will vary by site conditions and productivity, timber species, resource management objectives and timing of implementation.

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Appropriate silvicultural practices including site preparation, tree improvement, reforestation, release and weeding, thinning, fertilizing, pruning, sanitation harvest, salvage harvest, even aged harvests (shelter woods, seed tree, clearcuts) and uneven aged harvest (individual tree and group selection. Regeneration and tree stocking standards are defined at the local area.

1F-S20. Lands scheduled for timber harvest using even-aged practices should be managed on rotation(s) equal to or greater than 95 percent of culmination of mean annual increment of growth (based on cf measure).

1F-O15. Use timber management activities to promote horizontal and vertical vegetative diversity to help meet wildlife, aesthetic, recreational, and other objectives.

1F-S21. Where appropriate, stagger regeneration in space and time for even aged areas. Created openings should be separated by blocks of land or areas not classed as created opening. Harvested areas are not considered a created opening for timber management when tree stocking is above minimum levels, trees are 4' in height and free to grow.

1F-S22. Openings created by even aged harvesting should not exceed 40 acres; exceptions permitted under catastrophic conditions.

1F-O16. Provide for salvage harvest of timber killed or damaged by events such as wildfire, wind storms, insect and diseases, consistent with management objectives for other resources.

Objective. Provide habitat for viable populations of existing natives and desirable non-natives vertebrate wildlife species.

1T-S23. Old growth tree (reserve where appropriate) habitat (or develop replacement habitat where presently unavailable) should be maintained and well distributed across the landscape for indicator species dependent on old growth. Meet key species requirements by managing (reserve) areas of appropriate size and arrangement with adequate larger, older trees; proper stand structures and densities (usually multi-storied), snags and down logs; associated feeding habitat and other criteria.

1T-S24. Should manage dead trees (snags) to provide the required numbers and size of snags throughout the Forest to maintain primary cavity excavators at 40 to 60 percent of their potential population in timber production areas and appropriate levels in other areas; leave appropriate levels of green trees to serve as a source of future snags.

1T-S25. Should provide dead and down logs in appropriate numbers by size classes to support species that utilize this resource.

1T-S26. Should manage forest stands and shrub and grassland communities and successional stages to provide suitable big game habitat(s); cover quality, cover size and spacing, open road densities, and forage quality to meet species needs as defined in a Habitat Effectiveness Index.

1T-S27. Should protect big game habitats at key times including winter ranges, calving/fawning areas, wallows, and migration areas by maintaining desired vegetative structure and characteristics.

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1T-S28. Should manage unique or featured wildlife habitats including cliffs, talus, caves; seeps-springs; bogs, wallows and other wet areas (generally under 10 acres) to protect their primary values.

1T-S29. For Federal Threatened, Endangered, proposed, and special status species, shall use required biological assessment/evaluation procedures and meet consultation requirements. Promote preservation, restoration and/or maintenance of their habitats.

Wilderness and Reserves

1?-O21. Manage for natural ecological processes with minimal human interference; preserve and protect natural conditions, processes, and wilderness character.

Suggested Techniques
Replicate natural processes, disturbance events and cycles with prescribed fire(s). (Naturally occurring fires are considered prescribed fires until declared a wildfire (outside of prescription). Wildfires will be suppressed using appropriate agency suppression strategies.)

1?-S30. Recreation, range and other permitted activity use and facilities shall be managed to meet wilderness objectives and preserve wilderness character and values.

Suggested Technique
Use the Limits of Acceptable Change (LAC) process to determine management actions to preserve natural environments and provide for wilderness experiences.

1?-S31. Timber harvest and motorized vehicle access shall be prohibited (except emergencies or other authorized exceptions).

1?-S32. Manage Wilderness Study Areas (WSA) to protect and preserve their wilderness character. Protect and preserve Areas of Critical Environmental Concern (ACEC) special resource values.

Aquatic Ecosystems

Ecosystem Analysis

Not applicable except for NWFP

1A-O22. Objective: Inventory, treat and improve conditions in watersheds in need of restoration to reverse and arrest adverse impacts to water quality and fish habitat. Areas where fish habitat(s) or water quality have been adversely affected shall be given high priority for corrective treatments that mitigate impacts or rehabilitate these areas.

1A-S33. Meet or exceed state water quality protection and restoration requirements through planning, application and monitoring of Best Management Practices (BMPs).

1A-S34. Protect beneficial uses by implementing water quality practices, plans, and policies in current memorandums of understanding with the states.
1A-S35. Evaluate proposed projects or management actions for cumulative effects on water quality, quantity or stream channels.

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Suggested Techniques
Disperse activities in time and space, where practicable, to the extent needed to meet management requirements.

1A-O23. Provide and maintain a diverse, well distributed pattern of fish habitat to aid in increasing anadromous fish runs.
- Meeting criteria in state water quality standards for stream temperature and providing stream side vegetation to shade at least 60 percent of stream surface from June through September between hours 10 am and 4 pm.
- Maintaining sufficient large woody debris to provide for continuous long-term supply in all stream classes.
- Retaining 80 percent or more of the total lineal distance of stream banks in stable condition.
- Promoting bank, floodplain, and channel stability to provide resiliency to disturbance and foster aquatic diversity.
- Ensuring that 15 percent or less of stream substrate is covered by inorganic sediment.
- Providing pools that are adequately large, well distributed, and persistent during low flows and to conserve or restore channel morphology appropriate to the climate and landform.
- Providing at least 80 percent of site enhancement potential for cover for grass-forb, shrub and tree dominated sites in riparian areas.

Suggested Techniques
Use practices that maintain or promote sufficient residual vegetation to maintain, improve or restore riparian and wetland functions. Use practices that maintain or promote appropriate channel morphology and functions.

1A-O24. Achieve riparian and wetland area improvement and maintenance through management of existing uses, wherever feasible.

1A-O25. Maintain or improve riparian and wetlands to properly functioning condition.

1F-O26. Limit or mitigate ground disturbance in floodplains, riparian areas, and aquatic habitats to prevent soil movement, loss and sedimentation.

Direction Unique to Alternative 1
[Level 2]
Objectives and standards applicable to areas covered by the Northwest Forest Plan.

Social

Same as Alternative 1 level 1 direction

Economics

Same as Alternative 1 level 1 direction

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Tribal Trust Responsibilities

Northwest Forest Plan standards and guidelines see pages C-31 to C-38

Aquatics

1A-O1(2). General Aquatic Conservation:

- Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems.
- Maintain and restore spatial and temporal connectivity within and between watersheds.
- Maintain and restore the physical integrity of the aquatic system.
- Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.
- Maintain and restore the sediment regime under which aquatic ecosystems evolved.
- Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats, and to retain patterns of sediment, nutrient, and wood routing.
- Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.
- Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.
- Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

1A-O2(2). Emphasize riparian dependent resources by maintain and restoring riparian structure and function, conferring benefits to riparian dependent and associated species, enhancing habitat conservation for organisms that are dependent on transition zones between upslopes and riparian areas, improving travel and dispersal corridors for terrestrial animals and plants and providing greater connectivity of the watershed. Riparian Reserves serve as connectivity corridors among Late Successional Reserves.

1A-S1(2). Delineate and manage riparian reserves in all watersheds to protect and restore riparian and aquatic integrity and function according to prescribed widths for defined categories of streams or water bodies (see Alt. 2, standard 5-11.6).

1A-S/G(2). Standards and Guidelines: Apply special standards and guidelines that prohibit and regulate activities to lands along streams and unstable or potentially unstable areas where attainment of aquatic conservation objectives may be retarded or prevented. See Northwest Forest Plan standards and guidelines pages C-31 to C-38

1A-S2(2). To promote efficient and effective protection and restoration of aquatic/riparian resources in riparian areas, restoration and vegetation manipulation actions in RMAs should facilitate ecosystem function, reconnect linkages between aquatic, riparian, and upland environments, and focus on the causes of degradation. Note that some of these guidelines do not apply unless site-specific or ecosystem analysis is performed.

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1A-G1(2). To avoid artificial habitat edges at RMA boundaries in areas of timber harvest, livestock grazing, or vegetation manipulation, consider feathering vegetation structure between RMAs and adjacent lands. Implement feathering strategies so as to have negligible effect on bank stability, streamside shading, channel/floodplain interactions, and wood inputs to the aquatic/riparian system.

1A-G2(2). Design and implement treatments that affect riparian vegetation pattern, composition, or structure in a manner that reflects natural disturbance processes (e.g. flood, fire).

1A-G3(2). On rangelands, consider regulating domestic grazing intensity and season of use to limit bank trampling, restore plant vigor, promote vegetation cover, and increase energy storage.

1A-G4(2). On rangelands, consider regulating spring and seep development so as to protect ecological processes, functions, and states at these sites.

1A-G5(2). Consider locating water development, fencing, salt, and supplements on upland areas to keep domestic livestock from congregating in riparian areas.

1A-G6(2). Because fencing commonly fails at successfully excluding livestock, consider other management options prior to implementing permanent enclosures around riparian areas.

1A-G7(2). To reduce adverse consequences to aquatic/riparian resources due to roads, road obliteration and rehabilitation should be a high priority within RMAs.

1A-G8(2). Design of necessary new roads in RMAs should be done in a manner that does not disrupt natural hydrological flow paths, including diversion of streamflow and interception of surface and subsurface flow.

1A-G9(2). Construct necessary new roads and maintain existing roads in such a manner to minimize sediment introduction into aquatic environments and disruption of hydrologic regime.

1A-G10(2). Where appropriate, control road access, with the intent to limit introductions of exotic aquatic biota.

1A-G11(2). Construct all new road stream crossings within RMAs currently supporting fish species, or streams which historically supported native fish species, in such a manner to maintain fish passage.

1A-G12(2). All new road stream crossings shall be constructed to accommodate at least the 100-year flood event. Design criteria should be on the basis of standard engineering practices.

- fish and wildlife (?)
- research (?)
- watershed and habitat restoration. (?)

1A-O3(2). Key watersheds will be identified and managed to maintain and recover at risk stocks of fish through a system of large refugia (designated areas that provide or are expected to provide, high quality habitat). Two designations of key watersheds has been identified:

Key Watersheds (Tier 1 - Aquatic Conservation Emphasis) have been selected for directly contributing to conservation of at-risk anadromous salmonids, bull trout and resident fish species. Key watersheds (Tier 2 (other)) were selected as sources of high quality water and may not contain at-risk fish stocks.

1A-S2(2). In key watersheds, no new roads will be built in unroaded portions of inventoried roadless areas. Reduce road mileage outside roadless areas. Permit no net increase in the amount of roads, if funds are insufficient to implement reductions.

1A-G13(2). Key watersheds are the highest priority for watershed restoration.

1A-O4(2). Conduct ecosystem analysis within a watershed using the watershed analysis Procedures to help implement management objectives. Use information from watershed analysis to guide management prescriptions and monitoring strategies.

1A-S3(2). Watershed Analysis is required for (a) all key watershed and all roadless areas prior to resource management activities. Exceptions are minor activities categorically excluded under NEPA, (b) analysis of earthflows for inclusion with riparian reserve, and (c) modifications of riparian reserve boundaries.

1A-G14(2). Watershed Analysis is recommended for all other watersheds.

1A-O5(2). Design and implement watershed restoration activities to restore watershed processes, recover fish and riparian habitat and improve water quality.

1A-G15(2). Focus watershed restoration on removing roads and upgrading those that remain in the system. Apply silvicultural systems to restore and retain large conifers in Riparian Reserves.

Northwest Forest Plan Standards and Guidelines Common to All Land Allocations

Standards:

Standards and Guidelines from current plans apply where they are more restrictive or provide greater benefits to late-successional forest related species than other provisions of the (NW Forest Plan) Standards and Guidelines.

Exceptions consist of provisions in the NW Forest Plan that are specifically designed to replace direction in current plans including:

—Direction specific to management for the Northern Spotted Owl and its habitat.
—Administratively Withdrawn Areas that are specified in current plans to benefit certain late successional species are returned to the matrix unless local knowledge indicates the NW Forest Plan and direction will not meet management objectives for these species.
—Green tree retention standards for the matrix exceeding 15 percent in current plans are superseded by 15 percent retention direction in the Standards and Guidelines.
—For Adaptive Management Areas, direction in current plans needs to be considered during planning and implementation activities and may be modified in Adaptive Management Areas plans based on site specific analysis.

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Standard: Unmapped Late-Successional Reserves (See direction page C-3, NW Forest Plan Standards and Guidelines)

Standard: Watershed Analysis - see Watershed Analysis direction.

Standard: Research (See direction page C-4, NW Forest Plan Standards and Guidelines.

1M-O1. Survey and manage to provide benefits to amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens and arthropods.

1M-S1. Acquire and use information of known species sites in management of activities.

1M-G1. The appropriate action is generally protection of relatively small sites; for some species, the appropriate action includes use of specific management treatments.

1M-S2. Develop survey protocols for identified species (as scheduled) and complete prior to ground disturbing activities.

1M-S3. Conduct extensive surveys for species to find high-priority sites for species management (as scheduled).

1M-S4. Survey for and acquire additional information about certain species (arthropods, fungi species (not rate and endemic), bryophytes and lichens) to determine necessary levels of protection.

1M-S5. Known and newly discovered sites of certain identified mollusca and vascular plan species will be protected from grazing by all practicable steps.

Rangeland

Same as Alt 1 general

Forestland

Congressional Designations

1C-O1. Manage all lands with congressional designations, reserved for specific purposes, by following direction written in applicable legislation or plans.

1C-S1. In Congressionally Reserved Areas, the direction from standards and guidelines (from Northwest Forest Plan) also applies where it is more restrictive or provides greater benefits to late-successional forest related species, unless the application of standards and guidelines would be contrary to legislative or regulatory language or intent.

Late-Successional Reserves

1L-O1. Manage to protect and enhance conditions of Late-Successional and Old Growth forest ecosystems, which serve as habitat for late successional and old growth related species including the Northern Spotted Owl. Reserves are designed to maintain a functional interacting, later suc-

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cessional and old growth forest system. Late successional reserve areas have been designated including: mapped late-successional reserves, known spotted owl activity centers (in matrix and adaptive management areas) and protection buffers.

1L-S1. A management assessment should be prepared for each large Late Successional Reserve (or group of smaller LSRs) before habitat manipulation activities are designed and implemented. Late-successional assessments are subject to review by the Regional Ecosystem Office.

Managed Late-Successional Reserves

1G-O1. Manage to produce and maintain an optimal level of Late-Successional and Old Growth forest ecosystems on a landscape scale as identified for certain owl activity centers on the eastside where regular and frequent fire is a natural part of the ecosystem. Managed Late-Successional Areas have been designated for: Managed pair areas for known owl pairs and resident singles (in Washington Eastern Cascades) and Protection Buffers for specific endemic species.

1G-S1. Each managed late-successional area or group of smaller managed late-successional areas should have a management assessment, as described for late-successional reserves.

Standard: Late Successional Reserves - Silviculture
Stand and vegetation management of any type is considered a silvicultural treatment.

Guideline: Reduce Risk of Large-scale Disturbance
Risk reduction efforts to reduce the probability of major stand replacing events are encouraged consistent with the Late Successional Reserve direction.

Guideline: LSR - Silviculture
Silvicultural activities aimed at reducing risk shall focus on younger stands in Late Successional Reserves to accelerate development of late-successional conditions while making future stands less susceptible to natural disturbance.

Guideline: Late Sucessional Reserves - Silviculture
Treatments including salvage should not generally result in a degeneration of currently suitable owl habitat or other late successional conditions.

In LSRs where levels of risk are particularly high and additional measures are required, management activities designed to reduce risks are encouraged. Activities in older stands may be appropriate if: (1) proposed management activities will clearly result in greater assurance of long-term maintenance of habitat, (2) the activities are clearly needed to reduce risk, and (3) the activities will not prevent the LSR from playing an effective role in the objectives for which they were established.

Guideline: Late Successional Reserve - Salvage
Management following stand replacing event should be designed to accelerate the high quality habitat for species associated with late-successional conditions. Salvage activities should focus on long range conditions based on the desired future condition of the Forest.

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Guideline:
Specific salvage guides should be developed for each physiographic province and possibly different forest types within the province. Use the guidelines in the NW Forest Plan (p. C-14 to C-16) for salvage until province direction is provided.

Standards (and Guidelines): Late Successional Reserves - for Multiple Use Activities other than silviculture.
Most nonsilvicultural activities located inside late-successional reserves that are neutral or beneficial to the creation and maintenance of late successional habitat are allowed. Some existing uses and current development activities may be modified or eliminated that pose adverse impacts and changes made to current direction governing these activities (see NW Forest Plan, Standards and Guidelines, p. C-16 to C-19).

- Road Construction and Maintenance
- Fuelwood Gathering
- American Indian Use
- Developments
- Land Exchanges
- Habitat Improvement Projects
- Range Management
- Special Forest Products
- Other
- Research
- Right-of-way
- Contracted Rights
- Easements
- Special Use Permits
- Nonnative Species
- Fire Suppression and Prevention
- Recreational Use

1G-O2. Maintain suitable northern spotted owl habitat through time using various management techniques. Permit certain silvicultural and fire hazard reduction treatments to prevent complete stand destruction from large catastrophic events (such as high intensity, high severity fires or disease or insect epidemics).

1G-O3. Maintain an amount of suitable habitat equal to median amounts observed in pair home ranges in the Province. The location of this acreage may change through time as management is rotated through the area. Some uncertainty will be accepted in management to provide habitat in these areas and accommodation of risk should be considered in any Section 7 consultations in these areas.

Adaptive Management Areas
Objectives:
Learn how to manage on an ecosystem basis in terms of both technical and sound challenges and in a manner consistent with applicable laws.

Encourage the development and testing of technical and social approaches to achieving desired ecological, economic and other social objectives.

(See NW Forest Plan Standards and Guidelines, pages D-1 to D-12, for discussion of implementation and applicable Standards and Guidelines. One area - Snoqualmie Pass AMA, Washington, has been designated within the Eastside EIS area).

1D-S1. Silviculture, salvage and multiple use activities for these areas should always be guided by the objective of maintaining adequate amounts of suitable habitat.

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1D-S2. Standards and guidelines applicable for late-successional reserves for multiple use activities (other than silviculture) also apply to managed late successional areas. Protection buffers for certain rare and locally endemic species - assure viability.

Matrix Lands

1X-O1. On lands outside six categories of designated area, conduct most of the timber harvest and silvicultural activities on suitable forest lands, according to standards and guidelines. Most scheduled timber harvest contributing to probable sale quantities (PSQ) takes place in the matrix.

1X-O2. Provide a renewable supply of well distributed coarse woody debris in matrix management to maintain populations of various organisms that use this habitat structure.
2.1 Standard: Matrix - Course woody debris
Develop models for groups of plant associations and stand types that can be used as a baseline for developing prescriptions and local standards. Until local standards are developed, the following guidelines apply: A minimum of 120 linear feet of logs per acre greater than or equal to 16" in diameter and 16 feet long should be retained. Decay class 1 and 2 logs can be counted towards these totals. (See Matrix Standards and Guidelines, p. C-40 and C-41 for additional requirement).

2.2 Standard: Matrix - Course woody debris
Course woody debris already on the ground should be retained and protected to the greatest extent possible from disturbance during treatment. Down logs should be left within forest patches that are retained under green-tree retention guidelines.

1X-O3. Emphasize green tree and snag retention in Matrix management.
3.1 Standard: Matrix - Snag and green tree retention.
Retain at least 15 percent of the area associated with each cutting unit in the matrix lands. The limitation does not apply to intermediate harvest (thinnings) in evenaged young stands.

3.1 Guideline: Matrix - Snag and green tree retention.
As a general guide, 70 percent of the total area to be retained should be aggregates of moderate to larger size (0.2 to 1 hectare or more) with the remainder as dispersed structures (individual trees, possible including smaller clumps less than 0.2 hectare). Retention of large aggregates may be particularly important where adjacent areas have little late successional habitat. To the extent possible, patches and dispersed retention should include the largest, oldest live trees, decadent or leaning trees, and hard snags occurring in the unit. Patches should be retained indefinitely.

3.2 Standard: Matrix - Snag retention
As a minimum, snags should be retained with the harvest unit at levels sufficient to support species of cavity-nesting birds at 40 percent of potential population level based on published guidelines or models. The per acre requirement should be met on average areas no larger than 40 acres.

3.2 Guideline: Matrix - Snag retention
To the extent possible, snag management within the harvest units should occur within the areas of green tree retention (See also NW Forest Plan, Standards and Guidelines, page C-42 for additional direction).

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L3.3 Standard: Matrix - Lands - specific BLM direction
For lands administered by the BLM in Oregon, south of Grants Pass, retain 16 to 25 large green trees per acre in harvest units where available.

1X-O4. Provide additional protection for caves, mines, and abandoned wooden bridges and buildings that are used as roost and hibernation sites for bats.
4.1 Standard: Matrix - Bats
Conduct surveys of crevices in caves, mines and abandoned wooden bridges and buildings for presence of roosting bats.

4.2 Standard: Matrix - Bats
As an interim measure, timber harvest is prohibited within 250 feet of sites containing bats. Management standards and guidelines that may be included as mitigation measures in project or activity plans will be developed for the site. (See also Matrix. Standards and Guidelines, p. C-43 and C-44 for additional direction and discussion.)

1X-O5. Minimize soil and litter disturbance by modifying site treatment practices, particularly use of fire and herbicides, and modifying harvest methods.
5.1 Standard: Matrix - Modify site treatments
Site treatments should be prescribed which minimizes intensive burning, unless appropriate for certain specific habitats, communities or stand conditions. Prescribed fire should be planned to minimize the consumption of litter and coarse woody debris.

5.2 Standard: Matrix - Modify site treatments
Minimize soil and litter disturbance that may occur as a result of yarding and operation of heavy equipment and minimize the intensity and frequency of site treatments.

1X-O6. Provide for retention of old growth fragments in watersheds where little remains to support biological and structural diversity (refugia) across the landscape.

1X-S1. On fifth field watersheds (20-200 sq. miles), where federal lands currently comprised 15% or less of late successional forest should be managed to retain and protect all late successional stands.
8. Objective: Current Plans/Draft Plans Preferred Alternative
See NW Forest Plan, Standards and Guidelines, page C-45.

1X-O7. Management of stands in the matrix surrounding known Northern Spotted Owl Activity Centers will be designed to reduce risks of natural disturbance to protect owl habitat.

1X-O8. White-headed Woodpecker, Black backed woodpecker, Pygmy nuthatch, flammulated owl, and lynx should have protection buffers in the matrix. (See pages C-45 to C-48, NW Forest Plan Standards and Guidelines)

10. Objective: Matrix - Fire fuels
(See page C-48, NW Forest Plan Standards and Guidelines)

Minerals
Same as Alternative 1 level 1

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Wildlife
Same as Alternative 1 level 1

Direction for Alternative 2
Level 1
Objectives and Standards

Human Uses and Values

Same direction as Alternative 1.

Physical Environment

Terrestrial Ecosystems

Rangeland

Same direction as Alternative 1.

Disturbances

Same direction as Alternative 1.

Air Quality

Same direction as Alternative 1.

Forestland

Same direction as Alternative 1.

Objectives and Standards from Eastside Screens: RF Forest Plan Amendment #1, 5/20/94, and RF Forest Plan Amendment #2, 6/5/95.

2F-O14. All timber sales will be designated to incorporate interim standards for ecosystem analysis and management (six types of timber sales are exempt from consideration under this standard).

2F-S2.
- Characterize the proposed timber sale and its associated watershed for patterns of stand structure by biophysical environment and compare to the Historic Range of Variability (HRV).
- Use the processes and ecosystem characterization steps defined in Regional Forester's Forest Plan Amendment #2 (6/5/95).
- Identify structural components and biophysical environment combinations that are outside HRV conditions to determine potential treatment areas. Structural stages include: stand initiation, stem exclusion - open canopy, stem exclusion - closed canopy, understory reinitiation, multi-stratum without large trees; multi-stratum with large trees, and single stratum with large trees. (Structural stages definitions for use in HRV analysis can be found in the glossary.)

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Wilderness and Reserves

Same direction as Alternative 1.

Minerals

Same direction as Alternative 1.

Wildlife Habitat (objectives and standards from Eastside screens)

2W-O1. Maintain old growth tree (reserve where appropriate) habitat (or develop replacement habitat where presently unavailable) well distributed across the landscape for indicator species dependent on old growth. Meet key species requirements by managing (reserve) areas of appropriate size and arrangement with adequate larger, older trees; proper stand structures and densities (usually multi-storied), snags and down logs; associated feeding habitat and other criteria.

For Timber Sales use the following:

Use Scenario A whenever any one type of LOS in a particular biophysical environment is below HRV (9.1b).

Use Scenario B when both LOS stages within a particular biophysical environment are at or above HRV (9.1e).

LOS can be either "multi-strata with large trees" or single strata with large trees).

LOS stages are calculated separately.

2W-O2 (Scenario A). If either one or both of the Late and Old Structural stages fall below HRV in a particular biophysical environment within a watershed, then there should be no net loss of LOS from that biophysical environment.

2W-S1 (Scenario A). Do not allow timber sale harvest activities to occur within LOS stages that are below HRV. Harvest of dead trees may be permitted when standards for snags and down logs are met.

2W-G1 (Scenario A). Some timber sale activities can occur within LOS stages that are within or above HRV in a manner to maintain or enhance LOS within that biophysical environment. One type of LOS may be manipulated to move stands into the LOS stage that is deficit if this meets historical conditions.

2W-O3 (Scenario A). Outside of LOS, maintain and/or enhance LOS components in stands subject to timber harvest activities.

2W-S2 (Scenario A).

Maintain all remnant late and old seral and/or structural live trees >21" dbh that currently exist within stands proposed for harvest activities.

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Manipulate vegetative structure that does not meet late and old structural LOS) conditions using treatments that move stands toward appropriate LOS conditions to meet HRV.

Maintain open, park-like stand conditions where this condition occurred historically. Manipulate vegetation in a manner to encourage the development and maintenance of large diameter, open canopy structure. (While understory removal is allowed, some amount of seedlings, saplings, and poles need to be maintained for the development of future stands).

2W-O4 (Both Scenarios). Maintain connectivity and reduce fragmentation of LOS stands.

2W-S3. Maintain or enhance the current level of connectivity between LOS stands and Forest Plan designated "old growth" habitats by maintaining stands between them that serve the purpose of connections, using criteria for network pattern, connectivity corridor description, length of connection corridors and timber harvest and silvicultural criteria (RF Forest Plan Amendment #2, 6/5/95).

2W-O5 (Scenario B). Maintain wildlife habitat management options by impacting large and/or contiguous stands of LOS as little as possible, while meeting other multiple use objectives.

2W-S4 (Scenario B). Within a particular biophysical environment within a watershed, if the single, existing late and old structural (LOS) stage is WITHIN OR ABOVE HRV, OR if both types of LOS stages occur and BOTH are WITHIN OR ABOVE HRV, then timber harvest can occur within these stages as long as LOS conditions do not fall below HRV. Enhance LOS structural conditions and attributes as possible, consistent with other multiple use objectives.

Harvest activities, (any and all types being considered, can occur in the following stand types in order of priority:

First priority is within stands other than LOS.

Second priority is within smaller, isolated LOS stands <100 acres in size and/or at the edges (first 300 ft.) of large blocks of LOS stands (> 100 acres).

As a last priority some harvesting can occur within the interior of large LOS stands (>100 acres) (beyond 300 ft. from edge), but is limited to non-fragmenting prescriptions such as thinning, single-tree selection (UEAM), salvage, understory removal, and other non-regeneration activities. Group selection (UEAM) is only allowed when openings created either mimic the natural forest pattern, and/or do not exceed 1/2 acre in size; REGENERATION and GROUP SELECTION ACTIVITIES ARE NOT ALLOWED.

2W-O6. Manage dead trees (snags) to provide the required numbers and size of snags throughout the Forest to maintain primary cavity excavators at 40 to 60 percent of their potential population in timber production areas and appropriate levels in other areas; leave appropriate levels of green trees to serve as a source of future snags.

2W-S5 (timber sales). For snags, down logs and green tree replacement habitats (RF Forest Plan Amendment #2):

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Maintain snags and green tree replacement trees of >21 inches DBH (or whatever is the representative DBH of the overstory layer if it is less than 21 inches), at 100% potential population levels of primary cavity excavators.

For lodgepole pine stands, all sale activities will maintain snags and green replacement/roost trees of ≥ 10 inches dbh at 100 percent potential population levels of cavity excavators. The largest available trees should be left to meet this requirement.

Retain down logs at appropriate quantities while permitting accomplishment of fire protection needs for life and property and prescribed burning and without extraordinary measures to meet requirements.

Leave pre-activity (currently existing) levels down logs, unless they exceed the quantities listed below. Harvest activities should supplement pre-activity levels of down logs up to the maximum level shown below. Exceptions can be made where fire protection needs for life and property cannot be accomplished with this quantity of debris left on site.

Species	Piece Length Pieces Per Acre	Diameter Small End	Total Lineal Length
Ponderosa Pine	2-6	12"	>6 ft. 20-45 ft.
Mixed Conifer	15-20	12"	>6 ft. 100-140 ft.
Lodgepole Pine	15-20	8"	>8 ft. 120-160 ft.

2W-O7. Provide dead and down logs in appropriate numbers by size classes to support species that utilize this resource.

2W-S6 (timber sales). For snags, down logs and green tree replacement habitats (RF Forest Plan Amendment #2):

Maintain snags and green tree replacement trees of >21 inches DBH (or whatever is the representative DBH of the overstory layer if it is less than 21 inches), at 100% potential population levels of primary cavity excavators.

For lodgepole pine stands, all sale activities will maintain snags and green replacement/roost trees of ≥ 10 inches dbh at 100 percent potential population levels of cavity excavators. The largest available trees should be left to meet this requirement.

Retain down logs at appropriate quantities while permitting accomplishment of fire protection needs for life and property and prescribed burning and without extraordinary measures to meet requirements.

Leave pre-activity (currently existing) levels down logs, unless they exceed the quantities listed below. Harvest activities should supplement pre-activity levels of down logs up to the maximum level shown below. Exceptions can be made where fire protection needs for life and property cannot be accomplished with this quantity of debris left on site.

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Mixed Conifer	15-20	12"	>6 ft. 100-140 ft.
Lodgepole Pine	15-20	8"	>8 ft. 120-160 ft.

2W-O8. Manage forest stands and shrub and grassland communities and successional stages to provide suitable big game habitat(s); cover quality, cover size and spacing, open road densities, and forage quality to meet species needs as defined in a Habitat Effectiveness Index.

2W-O9. Protect big game habitats at key times including winter ranges, calving/fawning areas, wallows, and migration areas by maintaining desired vegetative structure and characteristics.

2W-O10. Manage unique or featured wildlife habitats including cliffs, talus, caves; seeps-springs; bogs, wallows and other wet areas (generally under 10 acres) to protect their primary values.

2W-O11. (Both Scenarios): As a minimum, manage to insure goshawk species viability by meeting the following standard; Forest Plan standards and guidelines that exceed the standards should be used instead of or in addition to.

2W-S7. Protect every known active and known nesting site used in the last 5 years.

Seasonal restrictions on activities near nest sites will be required for activity types that may disturb or harass pair while bonding and nesting.

30 acres of the most suitable nesting habitat surrounding all active and historical nest tree(s) will be deferred from harvest. A 400-acre "Post Fledging Area" (PFA) will be established around every known active nest site. While some harvest activities can occur within this area, retain at least 60 percent of the area in LOS condition or all the LOS stands if less than 60 percent. Enhance younger stands towards LOS condition, as possible.

Aquatic Ecosystems

2A-O1. Meet or exceed state water quality protection and restoration requirements through planning, application and monitoring of Best Management Practices (BMPs).

2A-O2. Protect beneficial uses by implementing water quality practices, plans, and policies in current memorandums of understanding with the states.

2A-O3. Evaluate proposed projects or management actions for cumulative effects on water quality, quantity or stream channels.

2A-O4. Disperse activities in time and space, where practicable, to the extent needed to meet management requirements.

2A-O5. Inventory, treat and improve conditions in watersheds in need of restoration to reverse and arrest adverse impacts to water quality and fish habitat.

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Objectives and Standards from Pacfish, Except Infish, as Noted.

2A-O6. For streams of moderate to large size (3rd to 7th order), within watersheds with anadromous fish the following (Interim) Riparian Management Objectives apply.

- No measurable increase in maximum water temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period. Maintain maximum water temperatures below 64°F within migration and rearing habitats and below 60°F within spawning habitats. INFISH - Maximum temperature below 59°F with adult holding habitat below 48°F within spawning and rearing habitat.
- In forested systems, provide large woody debris >20 pieces per mile; >12-inch diameter; >35 feet in length (for Oregon, Washington, and Idaho).
- In non-forested systems, maintain >80 percent bank stability and >75% of banks with <90 degree angle (i.e., undercut).
- Achieve a pool frequency for all systems: *Wetted width in feet:* 10, 20, 25, 50, 75, 100, 125, 150, 200; *Number pools per mile:* 96, 56, 47, 26, 23, 18, 14, 12, 9;
- [Pools per mile applies to Rosgen "C" channels within each system (Section 7 Fish Habitat Monitoring Protocol for the Upper Columbia Basin, June 1994). National Forests and BLM Districts are to develop pools/mile objectives for other appropriate stream channels.]
- Same as Alternative 1 for items c, e, and g.
- Maintain a width/depth ratio of all stream systems <10 mean wetted width divided by mean depth.

2A-S1. Delineate and manage (Interim) Riparian Habitat Conservation Areas (RHCAs) in every anadromous watershed to help maintain integrity of aquatic ecosystems. Standard widths are defined for:

- fish bearing streams; 300 ft;
- permanently flowing non-fish bearing streams, 150 ft.;
- ponds, lakes, reservoirs and wetlands greater than 1 acre, 150 ft.;
- seasonally flowing or intermittent streams, wetlands less than 1 acres, landslides and landslide prone areas;
- Key watersheds, 100 ft.;
- Non-key watersheds, 50 ft.;
- non-forested rangeland ecosystems - permanently flowing streams (100-year flood plain).

(See standard widths for defined categories of streams or water bodies for forested and rangeland systems in glossary OR could add widths definitions here.)

2A-S2. Project and site specific standards and guidelines apply to RHCAs and to projects and activities in areas outside RHCAs that would degrade them (See pages ______, PACFISH RHCA S&G's related to management activities): 1) Timber, 2) Roads, 3) Grazing, 4) Recreation, 5) Minerals, 6) Fire/Fuels, 7) Lands, 8) General Riparian, 9) Fish and Wildlife, 10) Research, and 11)Watershed and Habitat Restoration.

2A-O7. During the period of interim direction, all watersheds that contain designated critical habitat for listed anadromous fish will be treated as key watersheds to provide protection across the landscape where habitat for anadromous fish receive special attention and treatment.

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2A-S3. (For Key Watersheds to be developed at this stage, no direction found similar to Northwest Forest Plan.)

2A-O8. [INFISH Priority Watershed] Designated priority watersheds contain watersheds with excellent habitat or strong assemblages of inland native fish, with a priority on bull trout populations; watersheds that provide for meta-population objectives; and degraded watersheds with a high restoration potential to provide a pattern of protection across the landscape where habitat for inland native fish would receive special attention and treatment.

2A-S4. [INFISH Priority Watershed] Within priority watersheds, ongoing activities have been screened to categorize the extent of risk they represent to bull trout habitat or populations. Projects determined to be a high or medium risk must be reviewed by Forest Supervisors and, subject to valid existing rights, they have three options to pursue: Modify the action to reduce the risk; postpone the action until the final direction is issued; or within one month, Forest Supervisors will submit to their respective Regional Foresters an action plan for how high and moderate risk projects will be modified to avoid an unacceptable risk. Modifications for moderate and high risk projects should be initiated within 2 months with high risk projects having the highest priority. If there are compelling reasons why a project can not be modified delayed, or canceled, the Forest Supervisor will include in the action plan written documentation of the rationale for such action and what other mitigating measures will be implemented to assure there is not an unacceptable risk. For low risk projects, Forest Supervisors must provide an action plan by March 1, 1996, for means to assure there is not an unacceptable risk.

2A-O9. Use the Ecosystem Analysis at a Watershed Scale or other appropriate procedures to conduct Watershed Analysis to provide information to management in implementing management objectives.

2A-S5. Completion of a Watershed Analysis is required for the following:

I. Modifications of (Interim) RMO's which better reflect conditions attainable in a specific watershed or stream reaches.
II. Generally, modification of (interim) RHCAs boundaries (widths) in all watersheds or documented stream reach or site specific data with supporting rationale and effects of the change.
III. Prior to salvage cutting in RHCA's for watersheds with listed salmon or designated critical habitat.
IV. Prior to construction of new roads or landings in RHCA's for watersheds with listed salmon or designated critical habitat.
V. Prior to construction of new recreation facilities in RHCAs for watersheds with listed salmon or designated critical habitat.

2A-G1. Use Watershed Analysis as a basis for evaluating cumulative effects; defining restoration needs, goals, and objectives; implementing restoration strategies and monitoring effectiveness of watershed protection measures.

2A-O10. Use watershed restoration actions to improve the current conditions of watersheds to restore degraded habitat and to provide long-term protection to natural resources, including riparian and aquatic resources.

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2A-G2. Use information from Watershed Analysis (and project development) to initiate restoration strategies and projects where appropriate and funds are available. Key and priority watersheds have priority for conducting watershed restoration.

Ecosystem Analysis

See Objective 2A-09 and Standard 2A-S5.

Objectives and standards applicable to areas covered by the Northwest Forest Plan is the same as Alternative 1.

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Table 3-11. Objectives and Standards for Alternatives 1 - 7

Definitions

Objectives – measureable, **time-specific** indicators used to measure progress toward attainment of goals. They address short- and long-term actions taken to meet goals.

Standards – Required management actions addressing how to achieve objectives. Standards can include requirements to refrain from taking action in certain situations.

Guidelines – Suggested actions, priorities, processes, or prescriptions that are useful in meeting objectives; not required. Common terminology will be used prior to publication of the DEISs.

For these EISs, the following terminology has been used to distinguish standards from guidelines (source: FS Directive 1110.8, Degree of Compliance or Restriction in Directives):

Verb	**Degree of Compliance/Restriction**	**In the DEISs, Applies to**
Must, shall	Action is mandatory.	Standards
Should, ought	Action is required unless justifiable reason exists for not taking action.	Standards
May, can, could	Action is optional.	Guidelines
Will	Verb does not convey a degree of restriction. Applies only to a statement of future condition or an expression of time. Not to be used in place of shall or must.	DRFC

*** NOTE: The objectives that follow are intended to move conditions TOWARD the DRFC. ***

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For specific levels of activity by alternative and cluster, see tables 3-12 and 3-13. For associated guidelines, see list following this O&S table.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
ECOSYSTEM MANAGEMENT (EM)						
Not Applicable	Not Applicable	**EM-O1. Objective[P]:** Analyze ecosystems and components of ecosystems through multiple scales to identify patterns, processe, and disturbance mechanisms at scales consistent with causes and interactions at which they function. *See Standards EM-S1-7. See Guidelines EM-G1-7.*				
Not Applicable	Not Applicable	**EM-O2. Objective[P]:** Identify opportunities and establish priorities for vegetation, prescribed fire, aquatic, riparian, terrestrial, recreation, and watershed management at the 4th code HUC scale (subbasin and subsection scale) that combines information from the science assessment with finer scale data to tier to goals and objectives of the ICBEMP. *See Standards EM-S1-7. See Guidelines EM-G1-7.*				
Not Applicable	Not Applicable	**EM-O3. Objective[P]:** Move away from project driven watershed scale analysis and move towards watershed scale anaysis that support ecosystem planning.				
Not Applicable	Not Applicable	**EM-O4. Objective[P]:** Analyze ecosystems at the watershed scale using the federal interagency guide (version 2.2) and R1/R4/R6 policy implementation guide prior to management actions that have issues or effects at that scale.				
Not Applicable	Not Applicable	**EM-S1. Standard[P]:** Forest Service and Bureau of Land Management units shall conduct and complete a subbasin (4th HUC or groups of 4th HUC) analysis at a coarse scale using the science assessment and local information.				
Not Applicable	Not Applicable	**EM-S2. Standard[P]:** Ecosystem analysis at the watershed scale (20-200 square miles) should be completed that incorporates subbasin analysis results to support management prescriptions and recommendations.				
Not Applicable	Not Applicable	**EM-S3. Standard[P]:** Line officers should be involved to determine the level of analysis based on the issues and commitment of personnel, time, and funds for successful completion of the analysis.				
Not Applicable	Not Applicable	**EM-S4. Standard[P]:** Interim RMOs, RMAs, and standards and guidelines shall provide points of reference when conducting Ecosystem Analysis. The rationale and logic for deviation from these interim provisions shall be documented during the NEPA decision process.				
Not Applicable	Not Applicable	**EM-S5. Standard[P]:** If Ecosystem Analysis is completed for a watershed, Forest Service and BLM units should review the analysis for information to facilitate new project analysis. If information supports project issues, then incorporate the previous analysis in the NEPA decision process. If information does not support project issues, then further analysis which tiers to and supplements the previous analysis should be completed.				
Not Applicable	Not Applicable	**EM-S6. Standard[P]:** During the NEPA decision process for management actions that require an EA or EIS, Watershed Management Objectives should be developed that incorporate information and recommendations from Ecosystem Analysis. If a previous EA or EIS established Watershed Management Objectives, they should be reviewed to ensure applicability and modified if new information indicates they are inconsistent with management intent.				

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Not Applicable	Not Applicable	**EM-S7. Standard[P]:** Regional and State Offices should develop and coordinate an advisory and review process to ensure the intent of Ecosystem analysis is consistently applied within the Eastside and Upper Columbia River Basin EIS area.				
		EM-O5. Objective[S]: Eliminate/reduce the potential for disease transmission between domestic sheep and bighorn sheep.				
SOIL PRODUCTIVITY						
Current direction in handbook for FS lands	Current direction in handbook for FS lands	**EM-O6. Objective[S]:** Prevent degradation of soil quality and loss of soil productivity. *See Guidelines EM-G10-14.*				
		EM-O7. Objective[S]: Protect soil hydrologic function and productivity in riparian areas to preserve water quality buffering and regulation of nutrient cycling.				
		EM-O8. Objective[S]: Restore soil productivity, quality, and function in areas where loss has likely occurred.				
		EM-S8. Standard[P]: The Forest Service and BLM shall develop soil productivity protection and restoration programs based on inventories and existing information.				
		EM-O9. Objective[P]: Restore nutrient cycling and decomposition processes to provide for sustainable nutrient supply in forest and rangeland ecosystems by providing for natural levels of vegetation composition, density, size class, and distribution, both in standing and downed biomass, in a manner that allows for recruitment over time.				
		EM-S9. Standard[S]: Large diameter standing and downed wood should be retained on site, over time, to provide for carbon and nutrient stores.				
		EM-S10. Standard[P]: Recommendations for managing coarse woody debris shall be developed for local geoclimatic and vegetation type.				
		EM-S11. Default Standard[S]: In the absence of local data, the following amounts of coarse woody material will be minimums left on site. Unburned/low intensity burn sites: 10-15 tons/acre. Moderate intensity burn sites: 15-20 tons/acre. High intensity burn sites: 20-30 tons/acre.				

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ROADS						
Not Applicable	PACFISH, INFISH and access strategies needed for wildlife management	**EM-O10. Objective[S]:** Reduce road-related effects and potential effects on watersheds, soils, aquatic/riparian, and terrestrial resources at levels specified in tables 3-12 and 3-13 while providing for resource management activities and other anticipated human access needs such as recreation and tribal activities, etc. *See Standards EM-S12-17. See Guidelines EM-G15-40.*				
Not Applicable	Not Applicable	**EM-S12. Standard[P]:** Develop and implement a standardized road condition and risk inventory, in a consistent and systematic manner that addresses multiple scales, temporally and spatially.				
Not Applicable	Not Applicable	**EM-S13. Standard[S]:** Construct all new road crossings of streams and rivers that currently support fish species, or that historically supported native fish species, in such a manner as to maintain fish passage.				
Not Applicable	Not Applicable	**EM-S14. Standard[P]:** Transportation plans, including Access and Travel management plans, should be developed in an integrated resource manner. These plans should be used to support Ecosystem analysis at the watershed scale and to identify long-term transportation needs and road maintenance practices. These plans also should be used to identify and prioritize roads for rehabilitation, closure, or obliteration to reduce road-related effects to watershed, soil, terrestrial, and aquatic resources.				
Not Applicable	Not Applicable	**EM-S15. Standard[S]:** There shall be no net increase in road density in any clusters. Road mileage increases will be off set by a equal or greater mileage decrease on a per cluster basis.				
Not Applicable	Not Applicable	**EM-S16. Standard[S]:** Reduce the risk of wildlife mortality or displacement/avoidance caused by human access. Emphasize all forest clusters with the presence or potential of large carnivores.				
Not Applicable	Not Applicable	**EM-S17. Standard:** Not applicable.				**EM-S17. Standard[S] :** There shall be no road construction in reserves or unroaded areas larger than 1,000 acres.
NOXIOUS WEEDS						
Not Applicable	Not Applicable	**EM-O11. Objective[S]:** To maintain biodiversity and productivity of native rangeland plant communities.				

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Not Applicable	Not Applicable	**EM-S18. Standard[P]:** An integrated weed management (IWM) strategy for noxious weeds should be implemented. See Appendix H for a more complete discussion of the 7 basic steps of the IWM strategy. The 7 steps of the IWM strategy are common to all alternatives and are presented below: 1) Inventorying and mapping of noxious weed presence, distribution, and density. 2) Preventing weed encroachment. 3) Detecting and eradicating new introductions of noxious weeds. 4) Containing large-scale infestations of noxious weeds. 5) Controlling-suppressing large-scale infestations of noxious weeds. 6) Revegetating sites that are characterized by existing noxious weed infestations and a lack of understory of native species or exotic perennial seeded species. 7) Implementing proper range management practices during the management phase after noxious weed control.				
		EM-O12. Objective[S]: To ensure that management for noxious weeds is carried out efficiently and consistently across jurisdictional and political boundaries.				
		EM-O13. Objective[P]: To conserve biodiversity and productivity of native rangeland plant communities. The priority area for this objective is range cluster 2.	**EM-O17. Objective[P]:** To conserve and restore biodiversity and productivity of native rangeland plant communities. The priority area for this objective is range cluster 2.	**EM-O19. Objective[P]:** To conserve biodiversity and productivity of native rangeland plant communities. The priority area for this objective is range cluster 2 and 4.	**EM-O22. Objective[P]:** To conserve and restore biodiversity and productivity of native rangeland plant communities. Priority areas for this objective are range clusters 2, 3, and 5.	**EM-O24. Objective[P]:** within reserves To conserve biodiversity and productivity of native rangeland plant communities. Priority areas for this objective are range clusters 1-6. **outside reserves** Same as EM-O13, EM-O14, EM-O18, and EM-O21.

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		EM-S19. Standard[P]: Unless the intent of Objective EM-O13 can be achieved with an alternative method, steps 1-4 of IWM should be implemented. Implement the steps on high disturbance areas, and rangeland plant communities that are not infested currently with noxious weeds and are of high susceptibility to invasion by noxious weeds.	**EM-S20. Standard[P]:** Unless the intent of Objective EM-O17 can be achieved with an alternative method, steps 1-4 of IWM should be implemented on high disturbance areas, and rangeland plant communities that are not infested currently with noxious weeds and are of high or moderate susceptibility to invasion by noxious weeds; implement steps 1-7 of IWM, and especially steps 5-7, on high disturbance areas and rangeland plant communities that contain noxious weeds and are of high or moderate susceptibility to invasion by noxious weeds.	**EM-S21. Standard[P]:** Unless the intent of Objective EM-O19 can be achieved with an alternative method, steps 1-4 of IWM should be implemented. Implement these steps on high disturbance areas, and rangeland plant communities that are not infested currently with noxious weeds and are of high susceptibility to invasion by noxious weeds.	**EM-S22. Standard[P]:** Unless the intent of Objective EM-O22 can be achieved with an alternative method, steps 1-4 of IWM should be implemented on high disturbance areas, and rangeland plant communities that are not infested currently with noxious weeds and are of high or moderate susceptibility to invasion by noxious weeds; implement steps 1-7 of IWM, and especially steps 5-7, on high disturbance areas and rangeland plant communities that contain noxious weeds and are of high or moderate susceptibility to invasion by noxious weeds.	**EM-S23. Standard[P]:** within reserves Unless the intent of Objective EM-O24 can be achieved with an alternative method, steps 1-4 of IWM should be implemented. Implement these steps on high disturbance areas, and rangeland plant communities that are not infested currently with noxious weeds and are of high or moderate susceptibility to invasion by noxious weeds. **outside reserves** Same EM-S19, EM-S24, EM-S27, and EM-S29.
		EM-O14. Objective[S]: To conserve and restore biodiversity and productivity of native rangeland plant communities. The priority area for this objective is range cluster 3.	**EM-O15. Objective[S]:** To restore biodiversity and productivity of native rangeland plant communities, primarily through the use of native plant species. Priority areas for this objective are range clusters 1, 3, 4, 5, and 6.	**Same as EM-O14.**	**EM-O16 Objective: To** restore biodiversity and productivity of native rangeland plant communities, primarily through the use of native plant species. Priority areas for this objective are range clusters 1, 4, and 6.	

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		EM-S24. Standard[P]: Unless the intent of Objective EM-O14 can be achieved with an alternative method, steps 1-4 of IWM should be implemented on high disturbance areas, and rangeland plant communities that are not infested currently with noxious weeds and are of high susceptibility to invasion by noxious weeds; steps 1-7 of IWM, and especially steps 5-7, should be implemented on high disturbance areas and rangeland plant communities that contain noxious weeds and are of high susceptibility to invasion by noxious weeds.	**EM-S25. Standard[P]:** Unless the intent of Objective EM-O15 can be achieved with an alternative method, steps 1-7 of IWM, and especially steps 5-7, should be implemented. Implement these steps on high disturbance areas and rangeland plant communities that contain noxious weeds and are of high or moderate susceptibility to invasion by noxious weeds.	**Same as EM-S24.**	**EM-S26. Standard:** Unless the intent of Objective EM-O16 can be achieved with an alternative weed control strategy, steps 1-7 of IWM, and especially steps 5-7, should be implemented. Implement these steps on high disturbance areas, and rangeland plant communities that contain noxious weeds and are of high or moderate susceptibility to invasion by noxious weeds.	
		EM-O18. Objective[S]: To restore biodiversity and productivity of native rangeland plant communities, primarily through the use of native plant species. The priority area for this objective is range cluster 5.		**EM-O20. Objective[S]:** Provide forage for livestock production, while conserving biodiversity and productivity of native rangeland plant communities. The priority area for this objective is range cluster 5.		

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		EM-S27. Standard[P]: Unless the intent of Objective EM-O18 can be achieved with an alternative method, steps 1-7 of IWM, and especially steps 5-7, should be implemented. Implement these steps on high disturbance areas, and rangeland plant communities that contain noxious weeds and are of high susceptibility to invasion by noxious weeds.		**EM-S28. Standard[P]:** Unless the intent of Objective EM-O20 can be achieved with an alternative method, steps 1-7 of IWM, and especially steps 5-7, should be implemented on high disturbance areas, and rangeland plant communities that contain noxious weeds and are of high susceptibility to invasion by noxious weeds; implement steps 1-4 of IWM on high disturbance areas and rangeland plant communities that are not infested currently with noxious weeds and are of high susceptibility to invasion by noxious weeds.		
		EM-O21. Objective[S]: To restore biodiversity and productivity of native rangeland plant communities, primarily through the use of native plant species, while providing forage for livestock production. Priority areas for this objective are range clusters1, 4, and 6.		**EM-O23. Objective[S]:** To restore biodiversity and productivity of native rangeland plant communities, primarily through the use of native plant species, while providing forage for livestock production. Priority areas for this objective are range clusters 1 and 6.		

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		EM-S29. Standard[P]: Unless the intent of Objective EM-O21 can be achieved alternative method, steps 1-7 of IWM, and especially steps 5-7, should be implemented. Implement these steps on high disturbance areas and rangeland plant communities that contain noxious weeds and are of high susceptibility to invasion by noxious weeds.		**EM-S30. Standard[P]:** Unless the intent of Objective EM-O23 can be achieved with an alternative weed control strategy, steps 1-7 of IWM, and especially steps 5-7, should be implemented. Implement these steps on high disturbance areas and rangeland plant communities that contain noxious weeds and are of high susceptibility to invasion by noxious weeds.		
		EM-S29. Standard[P]: Unless the intent of Objective EM-O21 can be achieved with an alternative method, steps 1-7 of IWM, and especially steps 5-7, should be implemented. Implement these steps on high disturbance areas and rangeland plant communities that contain noxious weeds and are of high susceptibility to invasion by noxious weeds.		**EM-S30. Standard[P]:** Unless the intent of Objective EM-O23 can be achieved with an alternative weed control strategy, steps 1-7 of IWM, and especially steps 5-7, should be implemented. Implement these steps on high disturbance areas, and rangeland plant communities that contain noxious weeds and are of high susceptibility to invasion by noxious weeds.		

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<table>
<tr><th>Alternative 1</th><th>Alternative 2</th><th>Alternative 3</th><th>Alternative 4</th><th>Alternative 5</th><th>Alternative 6</th><th>Alternative 7</th></tr>
<tr><td colspan="7">SOCIAL AND ECONOMIC (SE)</td></tr>
<tr><td colspan="2">Provide a sustained yield of commodities (timber, other forest products, and forage for livestock and wild horses).</td><td colspan="5">SE-O1 Objective[S]: Provide a sustainable and predictable level of goods and services from Forest Service- or BLM-administered lands, consistent with legal requirements and ecosystem capabilities. Generate economic activity in rural communities, including private sector employment, agency employment, income, number of recreation visits, and revenues shared with local governments.</td></tr>
<tr><td>Tables 3-12 and 3-13 displayed for comparison</td><td>Tables 3-12 and 3-13 displayed for comparison</td><td colspan="5">SE-O2 Objective[S]: Derive social and economic benefits, promote new commercial activity, reduce future agency land management costs including but not limited to wildfire suppression costs, and increase demand for labor and capital formation through activities which restore ecosystem functions and processes at the levels described in tables 3-12 and 3-13.</td></tr>
<tr><td rowspan="2">Table 3-12 displayed for comparison</td><td rowspan="2">Table 3-12 displayed for comparison</td><td colspan="5">SE-O3 Objective[S]: Avoid future large shifts in commercial activity that cause rapid changes in demand for labor (gain or loss of jobs) and capital (investments in plant and equipment) by offering commercial timber for sale at an amount consistent with the volume available from the acreage of timber harvest planned in tables 3-12. (See Guideline SE-G1) Limit annual variation in timber production by no more than . . .</td></tr>
<tr><td>. . . plus or minus 15 percent.</td><td>. . . plus or minus 25 percent.</td><td>. . . plus or minus 15 percent.</td><td>. . . plus 10 or minus 20 percent.</td><td>. . . plus or minus 50 percent.</td></tr>
<tr><td>Not Applicable</td><td>Not Applicable</td><td colspan="5">SE-S1 Standard[P]: Individual units shall achieve Objective S-O3 unless an exemption is granted from the Regional Forester or BLM State Director based on circumstances which make the objective unattainable.</td></tr>
<tr><td>See table 3-13</td><td>See table 3-13</td><td colspan="5">SE-O4 Objective[S]: Offer forage for livestock grazing consistent with the levels in tables 3-13.</td></tr>
<tr><td>Not Applicable</td><td>Not Applicable</td><td colspan="5">SE-O5 Objective[S]: Emphasize customary economic uses in rural communities or geographic areas identified as less economically diverse and more dependent on outputs of goods and services from Forest Service and BLM administered lands based on: (1) where these uses generate a substantial percent of local employment; (2) that are geographically isolated; and (3) that are not gaining substantial employment opportunities in other industries. These areas are henceforth referred to as "priority areas." Prioritize activities on tables 3-12 and 3-13 in these areas to promote such customary uses as well as new activities in these priority areas.</td></tr>
<tr><td>Not Applicable</td><td>Not Applicable</td><td colspan="5">SE-S2 Standard[P]: Priority areas shall be established in the Record of Decision. Changes to priority areas shall occur by amendments to land use plans. Priority areas shall be reassessed every five years to determine if conditions warrant a change in priority area designation.</td></tr>
</table>

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COMMUNITY RESILIENCY						
Not Applicable	Not Applicable	**SE-O6 Objective[S]:** Within three years support rural communities in their efforts to become more resilient by implementing policies which favor local labor, resources and knowledge and local use of resources from Forest Service and BLM-administered lands in the implementation of objectives SE-O1, SE-O2, SE-O3, SE-O8, and SE-O18.				
Not Applicable	Not Applicable	**SE-O7 Objective[P]:** Within three years support local strategies that enhance social and economic conditions in rural communities. Define a federal agency role which assists in providing developmental, tourism, and recreational activities that help diversity rural economies and improve quality of life. *(See Guidelines SE-G4 through SE-G13).*				
Not Applicable	Not Applicable	**SE-O8 Objective[S]:** Reduce the risk of life and property loss due to wildfire and decrease future wildfire suppression costs by actively managing wildland fuels on areas of Forest Service and BLM administered lands within or adjacent to wildland-urban interface areas. *(See Standard SE-S3. See Guidelines SE-G14–15)*				
Not Applicable	Not Applicable	**SE-S3 Standard[P]:** Involve local governments plus other landowners' organizations as appropriate in development of coordinated fuel management plans and priorities.				
INTERGOVERNMENTAL AND INTERAGENCY COORDINATION						
Not Applicable	Not Applicable	**SE-O9 Objective[P]:** To increase public ownership of decisions, begin greater collaboration through increased intergovernmental coordination with State, local and tribal governments, and interagency coordination with other Federal agencies in planning, implementation, and monitoring efforts in order to seek the knowledge and opinions from governmental agencies.				
Not Applicable	Not Applicable	**SE-S4 Standard[P]:** Within 2 years, each National Forest and BLM District shall sign a memorandum of understanding or equivalent document with appropriate State, county and tribal elected officials to detail, among other things, how to use the exemption from the Federal Advisory Committee Act in P.L. 104-1, for elected officials to offer advice and recommendations to Federal land managers.				
Not Applicable	Not Applicable	**SE-O10 Objective[S]:** Improve stability of Federal payments to local governments to contribute to long-term budget consistency and planning of local government revenues through increased predictability (S-O1) of goods and services from Federal lands.				
ROLE OF THE PUBLIC						
Not Applicable	Not Applicable	**SE-O11 Objective[P]:** To help achieve greater predictability for outcomes from lands managed by the Forest Service or BLM and better public ownership of decisions, by providing increased levels and types of opportunities for involvement of the public. Within 1 year develop and implement a systematic approach to seeking the knowledge and opinions of a broad range of stakeholders through methods that encourage discussion, understanding, and resolution of issues. *See Guidelines SE-G16 through SE-G26).*				

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RECREATION OPPORTUNITIES						
SE-O12 Objective[S]: Manage for a broad range of resource- dependent, land and water-based recreation opportunities to provide a variety of recreation experiences and outcomes.			**SE-O12 Objective[P]:** Manage for a broad range of resource-dependent, land and water-based recreation opportunities to provide a variety of recreation experiences and outcomes. In addition, identify opportunities to capitalize on restoration efforts by creating new opportunities for low-impact, nature-appreciative recreation and tourism.	**SE-O12 Objective[P]:** In areas where recreation is the primary emphasis (Forest Cluster 1; Range Clusters 2,3) and secondary (Forest Clusters 2,6; and Range Cluster 5), emphasize the most appropriate recreation and tourism opportunities that reflect current and projected demand and for which public lands are best suited.	**SE-O12 Objective[P]:** Manage for a broad range of resource-dependent, land and water-based recreation opportunities to provide a variety of recreation experiences and outcomes. In addition, identify opportunities to capitalize on restoration efforts by creating new opportunities for low-impact, nature-appreciative recreation and tourism	**SE-O12 Objective[P]:** In areas outside reserves, manage for a broad range of resource-dependent, land and water-based recreation opportunities to provide a variety of recreation experiences and outcomes. Within reserves, maintain or achieve primitive and semi-primitive settings that provide opportunities for solitude and other benefits associated with these settings.
SE-S5 Standard[P]: Use the recreation opportunity spectrum (ROS) or other appropriate agency direction to guide inventory and management to meet goals for recreation settings and experiences.				Not applicable	**SE-S5 StandardP]:** Same as Alternatives 1, 2, 3, and 4.	**SE-S5 Standard[S]:** Outside reserves, same as Alternatives 1, 2, 3, 4, and 6. Manage reserves for primitive and semi-primitive settings.
Varies by BLM and Forest Service land use plan.	Varies by BLM and Forest Service land use plan.	**SE-O13 Objective[P]:** Identify opportunities to provide public access for land and water-based recreation purposes.				
Varies by BLM and Forest Service land use plan.	Varies by BLM and Forest Service land use plan.	**SE-O14 Objective[P]:** Foster and strengthen partnerships between public and private sectors to raise the quality and quantity of recreation and tourism facilities and services, to avoid duplication, and to share resources.				

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For specific levels of activity by alternative and cluster, see tables 3-12 and 3-13. For associated guidelines, see list following this O&S table.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Varies by BLM and Forest Service land use plan.	Varies by BLM and Forest Service land use plan.	**SE-O15 Objective[S]:** Take actions that will lead to recreation programs operating in a financially self-supporting manner.				
QUALITY OF LIFE						
Not Applicable	Not Applicable	**SE-O16 Objective[S]:** Enhance scenic integrity in areas currently rated as low or moderately low by implementing management activities for forest and range vegetation and road densities at the levels described in tables 3-12 and 3-13. *(See Guidelines SE-G83 through SE-G84).*				
Meet established visual quality objectives based on management principles and techniques from the applicable agency visual landscape management system.		**SE-O17 Objective[S]:** Maintain the highest level of scenic integrity and decrease short- and long-term risks from wildfire by implementing activities for forest and range vegetation and road densities at the levels described in tables 3-12 and 3-13. *(See Guidelines SE-G85–87).*				Not applicable in reserves.
Not Applicable	Not Applicable	**SE-O18 Objective[S]:** Protect human health and decrease short- and long-term risks of degraded air quality from wildfire by implementing vegetation management activities at the levels in tables 3-12 and 3-13.				
TRANSPORTATION AND UTILITY CORRIDORS						
Not Applicable	Not Applicable	**SE-O19 Objective[S]:** Ensure that reliable and buildable utility corridors are available to serve regional and local energy, communication and transportation needs, and that essential access for energy repairs and maintenance is available.				
Not Applicable	Not Applicable	**SE-S6 Standard[S]:** Maintain access to existing corridor right-of-ways, special use permits and easements for infrastructure maintenance.				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
TRIBAL INTERESTS (T)						
Varies by BLM or forest service land use plan.		**T-O1. Objective[P]:** To help meet the Federal government's responsibility maintain a government to government relationship with affected federally recognized tribes. Develop meaningful relationships to understand and incorporate tribal needs, interests, and expectations in Federal land management; allow cooperative activities where there are shared goals.				
Varies by BLM or forest service land use plan.		**T-S1. Standard[P]:** (1) Agencies shall consult with all affected federally recognized tribes on projects at the proposal stages, and at other stages as appropriate. (2) Agencies should consult with all affected Indian tribes/ communities on project at proposal stages, and at other stages as appropriate.				
Table 3-12 displayed for comparison	Table 3-12 displayed for comparison	**T-O2. Objective[S]:** To help meet the Federal government's responsibility toward tribes, maintain and/or restore habitat conditions at or above a level capable of supporting healthy, sustainable, and usable quantities of species/resources by implementing activities in Tables 3-12 and 3-13.				
Varies by BLM or forest service land use plan.		**T-S2. Standard[P]:** (1) Agencies shall assess habitat conditions (using biological evaluations or other means) and discuss assessments with affected tribes at the earliest practical stage in planning a project. (2) Agencies shall assess habitat conditions (using biological evaluations or other means) where a habitat has an identified social or traditional importance to an affected tribe or American Indian community, such as root fields or fishing grounds.				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
TERRESTRIAL ECOSYSTEMS						
DISTURBANCE PROCESSES ON FORESTLANDS AND RANGELANDS: FIRE (F)						
F-O1. Objective[P]: Use prescribed fires from either management ignitions or natural ignitions as a means of achieving management objectives defined in land use plans. Allow lightning-caused fires to play, as nearly as possible, their natural ecological role in Wilderness by developing prescribed fire plans.		**F-O1. Objective[P]:** Restore fire as a natural disturbance process by developing and implementing prescribed fire plans on a landscape scale. Acres to be included in prescribed fire plans approximate the levels described in table 3-2a and 3.3. *See Standard F-S1. See Guidelines F-G1–12, F-G66-70, F-G73- 74, F-G76-98.*				**F-O1. Objective[P]:** Restore fire as a natural disturbance process by developing and implementing prescribed fire plans on a landscape scale, including all reserves. Acres to be included in prescribed fire plans approximate the levels described in table 3-2a and 3.3. *See Standard F-S1. See Guidelines F-G1–12, F-G66-70, F-G73-74, F-G76-98.*
Not Applicable	Not Applicable	**F-O2. Objective[S]:** Rehabilitate and/or reforest burned and/or harvested areas with ecologically appropriate species and strategies tailored to the fire regime inherent to the site, wherever it is determined that the density, structure, and composition of the vegetation will not resemble desired conditions within ten years. *See Standard F-S1.*				
Not Applicable	Not applicable	**F-S1. Standard[S].** (applies to F-O1, F-O2): Rest areas burned by wildfire or prescribed fire from livestock grazing until monitoring data indicate that desired vegetation and litter have recovered to levels that are adequate to protect the soil.				
Not Applicable	Not Applicable	**F-O3. Objective[P]:** When conducting Escaped Fire Situation Analyses for wildfires, recognize and evaluate the long-term effects of fire and alternative suppression strategies on the ecosystem in which fire occurs. *See Guidelines F-G13-16, F-G66-70, F-G73-74, F-G76-98.*				

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FORESTLANDS						
ALL FORESTED POTENTIAL VEGETATION GROUPS						
		F-O4. Objective[P]: Maintain biodiversity and productivity of native forested plant communities through the management of noxious weeds.	**F-O4. Objective[P]:** Maintain and/or restore biodiversity and productivity of native forest communities through management of noxious weeds.	**F-O4. Objective[P]:** Maintain biodiversity and productivity of native forested plant communities through the management of noxious weeds.	**F-O4. Objective[P]:** Maintain and/or restore biodiversity and productivity of native forest communities through management of noxious weeds.	**F-O4. Objective: within** reserves Not applicable **outside reserves** Same as alternative 3-6.
		Rationale – *Although departures of forest ecosystem from historical conditions were found through the landscape ecology assessment (CH. 2 STARS) to be mostly attributed to road and harvest systems, changes in landscape vegetation composition and structure, and changes in fire regime, they were also related to a lesser degree to the invasion of exotics.*				
		F-S2. Standard[P]: An integrated weed management (IWM) strategy for noxious weeds should be implemented. In lieu of a more effective strategy, the default standard should be to use the IWM Strategy described in Appendix H. The 7 steps of the IWM Strategy are common to all alternatives, but alternatives differ in the extent of completion of all 7 steps. See Standard EM-S18 in the Ecosystem Management/Noxious Weed section for a list of the IWM steps. For forest ecosystems, step 7 should read: "Implementing *vegetation management* activities in such a manner as to prevent the invasion of noxious weeds after noxious weed control."				**F-S2. Standard: within reserves** Not applicable **outside reserves** Same as alternative 3 & 5.
		F-O5. Objective[S]: Maintain viability and ensure long term evolutionary potential of native terrestrial plant and animal species.				
		F-O6. Objective[S]: Provide for range-wide recovery of federally listed species, federal candidate species and prevent listing of species given special management consideration by the BLM and Forest Service, for example, USFS Forest Service Sensitive Species and USDI Bureau of Land Management Species of Special Concern.				
		F-07. Objective[S]: Manage habitats to ensure long term viability, in full recognition of the ecological importance of special assemblages of species, endemic vertebrates, disjunct vertebrates and vertebrate carnivores, rare plants and amphibians. (See map x)				
		F-O8. Objective[S]: Manage identified important habitats which contain centers of biodiversity, rarity and endemism as well as disjunct vertebrate carnivores to maintain long term ecological integrity. (refer to map xx)				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
		[1]**F-O9. Objective[S]:** Manage all Forested PVGs to ensure retention/recruitment of snags and downed logs to maintain viability of associated species and ecological integrity on lands subject to management activities.				
		F-O10. Objective[S]: Reduce the risk of direct mortality caused by human access, with emphasis on large carnivores/ omnivores.				
		F-O11. Objective[S]: Wintering wildlife should be given management priority.				
		F-O12. Objective[P]: Maintain options for evolutionary processes by reference to multiple ecological domains such as peripheral ERUs to maintain long term habitat integrity and to provide for unique species, species assemblages and ecosystems (refer to maps XXX).				
		F-O13. Objective[S]: Maintain habitat and habitat components for species associated with late/old seral structure and occurrence.				
[1]**Default Standard (F-O9):** For administrative units that have not conducted a local analysis of snag habitat retention needs provide the following; Dry Forest PVG (2 snags/acre, >21" DBH), Moist Forest PVG (6 snags/acre >21" DBH) and in the Cold Forest PVG (8 snags/acre >12" DBH). Applies to lands where forest management activities occur.						
			F-S3. Standard[P]: In lieu of a more effective strategy, use the IWM Strategy described in Appendix H. Implement the 7 steps of the IWM Strategy. See Standard EM-S18_ in the Ecosystem . Management/Noxious Weed section for a list of the IWM steps. For forest ecosystems, step 7 should read: "Implementing *vegetation management* activities in such a manner as to prevent the invasion of noxious weeds after noxious weed control."		**F-S3. Standard[P]:** In lieu of a more effective strategy, use the IWM Strategy described in Appendix H. Implement the 7 steps of the IWM Strategy. See Standard EM-S18 in the Ecosystem Management/Noxious Weed section for a list of the IWM steps. For forest ecosystems, step 7 should read: "Implementing *vegetation management* activities in such a manner as to prevent the invasion of noxious weeds after noxious weed control."	

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					F-O14. Objective[P]: Determine the ability of mechanical vegetation and fuel management methods (for example, harvest, thinning, chipping) to mimic the effects of natural disturbance regimes on ecosystem processes and functions.	
					F-O15. Objective[P]: Determine the relative importance of various conduits of noxious weed or exotic plant species introduction to improve the effectiveness of noxious weed control.	
					F-O16. Objective[P]: Emphasize restoration that supports learning about management of forested systems over all Forest Clusters. Activity methods used for restoration will vary across the Forest Clusters.	

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
					Rationale *– The landscape ecology assessment (STAR) identified the dry forest potential from historical conditions. These changes include a loss of scattered overstory ponderosa pine, western larch and Douglas fir, a loss of single-layer late-seral structural stages, and increase in mid-seral multi-story stands, a general trend towards increased tree densities, a shift of species dominance from shade-intolerant to shade-tolerant, and a shift from a dominance of low intensity/high frequency fire regimes toward higher intensity/lower frequency regimes. These changes have predisposed forest landscapes to larger scale disturbances than would have naturally occurred with endemic fire, insect and disease disturbances. Consequently, wildlife habitat characterized by large trees and single storied late seral stands has declined.*	

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		F-S4. Standard[S]: Decrease total patch number, and increase mean patch size, overall amount, and connectivity of late seral/old forest ecosystems over the long-term at the 4th code HUC scale in PVGs demonstrated to be deficient in late seral structure. Plan for replacement of areas meeting late seral/old forest structural attributes for habitat needs of late seral/old forest dependent species, and ensure consistency with desired disturbance regimes. *See Objectives F-O17, F-O20, F-O23.*				**F-S4. Standard: within reserves** Not applicable **outside reserves** Same as alternative 3-6.
		Rationale *– The landscape ecology assessment (STAR) found that in most cases the current amount of late-seral forest ecosystems is below the historic range of variability. As a whole, the landscape characterization area appears to be more fragmented than the historical landscape, with indices for large patches, and mean patch size decreasing.*				
		F-S5. Standard[P]: Develop late successional/old forest structural definitions for all PVTs, taking into account local site conditions, using at a minimum ranges for the following attributes: a) number of large trees (including those necessary for future snag recruitment), b) number of snags, c) amount of downed woody material, d) amount and size of gaps/openings, e) number of canopy layers, f) native shrub/herb components.				
		F-S6. Standard[S]: When managing vegetation to increase the amount of late-seral structure, use silvicultural and prescribed fire methods which create/enhance late-seral/old forest components.				**F-S6. Standard: within reserves** Not applicable **outside reserves** Same as alternative 3-6.
		F-S7. Standard: Not applicable				**F-S7. Standard[S]:** There shall be no commercial harvest in reserves. Limited silvicultural activities shall be allowed to enhance species viability.
DRY FOREST						
Not Applicable except for table _ displayed for comparison	Not Applicable except for table _ displayed for comparison	**F-O17. Objective[S]:** In order to restore ecosystem processes, manage vegetative structure, stand density, species composition, patch size, pattern, and fuel loading and distribution to a condition where the ecosystem sustains and is resilient to endemic levels of fire, insects, and disease. Implement management activities at a rate that approximates the levels described in table 3-12. *See Standard F-S8. See Guidelines F-G30-46, F-G66-104.*				

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		F-S8. Standard[S]: Increase the dominance of ponderosa pine in late-seral single strata, and the amount of western larch in late-seral single and late-seral multi-strata structural stages to approach the desired range. Decrease the amount of Douglas-fir, grand fir, and white fir in all structural stages.				**F-S8. Standard: within reserves** Not applicable **outside reserves** Same as alternative 3-6.
Not Applicable except for table _ displayed for comparison	Not Applicable except for table _ displayed for comparison	**F-O18. Objective[S]:** In areas that are currently within, or have been restored to the DRFC, manage production activities and levels on lands available and suitable for commodity production consistent with maintaining ecosystem processes, including disturbance intensities and frequencies, within the desired range of variability. *See Guidelines F-G30-46, F-G66-104.*				
		F-O19. Objective[P]: Prioritize vegetation management within Forest Clusters as follows: **Forest Cluster 1** – Prioritize areas where late seral structure has declined, where roading has already occurred and there is low risk to aquatic integrity. **Forest Cluster 2** – Prioritize areas where fire risk has increased, roading has already occurred and there is low risk to aquatic integrity. Where early and late seral forests have decreased, and mid seral forests have increased, focus on moving mid-seral shade tolerant forests toward shade-intolerant old forest or regeneration. **Forest Cluster 3** – Areas where restoration or production activities might degrade watersheds are a low priority; prioritize watersheds in poorest overall condition. Prioritize that are already roaded, and show a high departure in fire severity and frequency for any restoration or production activity. **Forest Cluster 4** – Roaded areas and areas that could be restored in combination with watershed restoration would be high priority. **Forest Cluster 5** – Focus on moving mid-seral structure toward late (preferred) or early seral shade-intolerant structure. Focus on areas that are highly roaded, where some road closures or production activity which may degrade watersheds with sensitive anadromous fish or narrowly distributed endemic species would be a low priority. **Forest Cluster 6** – Activity in subwatersheds that support strongholds of native fish, and where restoration and production activities may degrade watershed health is a low priority.				
		Rationale *– The Science Integration Team (SIT) classified forestland conditions, integrating vegetative, aquatic and hydrologic integrity and resiliency, into 6 forest clusters. These clusters provide the best foundation available to establish vegetation management priorities due to their integration of a variety of ecological parameters (see"Recent changes in terrestrial and aquatic ecosystem conditions of subbasins within the Interior Columbia River Basin and implications for management," draft 1/30/96).*				
		Rationale *– This cluster is dominated by moist and more production forest types. Subbasins exhibit low forest integrity, they are highly departed from historic conditions, they contain little wilderness and unroaded areas, and are likely to be heavily roaded. Forest structure and composition have been altered by past management. Forest structure is currently more homogeneous than historically. Late-seral structural stages have all but disappeared, with large increases in mid-seral structure.*				

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MOIST FOREST						
Not Applicable except for table _ displayed for comparison	Not Applicable except for table _ displayed for comparison	**F-O20. Objective[S]:** In order to restore ecosystem processes, manage vegetative structure, stand density, species composition, patch size, patch distribution, and fuel loading and distribution to a condition where ecosystems sustain, and are resilient to endemic levels of fire, insects and disease. Focus restoration on areas which have the highest potential to maintain viability of and/or attain an increase of western white pine. Implement management activities at a rate that approximates the levels described in table 3-12. *See StandardF-S9. See Guidelines F-G48-59, F-G31-39, F-G66-104.*				
		Rationale *–The landscape ecology assessment (STAR) identified moist forest as exhibiting significant change, although less than dry forest. Much the same as dry forest, these changes include a loss of scattered overstory ponderosa pine, western larch and western white pine, loss of single-story ponderosa pine and codominant seral species, an increase in multi-story stands and a general trend towards overstocking and change of species from shade-intolerant to shade-tolerant. These changes, together with the introduction of white pine blister rust have predisposed forest landscapes to larger scale disturbances than would have naturally occurred with frequent low intensity fires and endemic levels of insects and diseases. Late- and early-seral structures have significantly declined, with compensating increases in mid-seral structure across most sub-basins. Consequently, forest structure is more homogeneous than it was historically. The result has been a reduction of wildlife habitat, especially large trees, and single-storied old growth stands.*				
Not Applicable except for table _ displayed for comparison	Not Applicable except for table _ displayed for comparison	**F-O21. Objective[S]:** In areas that are currently within, or have been restored to the DRFC, manage production activities and levels on lands available and suitable for commodity production consistent with maintaining ecosystem processes, including disturbance intensities and frequencies, within the desired range of variability. *See Guidelines F-G48-59, F-G31-39, F-G41-45, F- G66-104.*				
		F-O22. Objective[P]: Prioritize vegetation management within Forest Clusters as follows (same as Objective F-O19 for Dry Forest): **Forest Cluster 1** – Prioritize areas where late seral structure has declined, where roading has already occurred and there is low risk to aquatic integrity. **Forest Cluster 2** – Prioritize areas where fire risk has increased, roading has already occurred and there is low risk to aquatic integrity. Where early and late seral forests have decreased, and mid seral forests have increased, focus on moving mid-seral shade tolerant forests toward shade-intolerant old forest or regeneration. **Forest Cluster 3** – Areas where restoration or production activities might degrade watersheds are a low priority; prioritize watersheds in poorest overall condition. Prioritize that are already roaded, and show a high departure in fire severity and frequency for any restoration or production activity. **Forest Cluster 4** – Roaded areas and areas that could be restored in combination with watershed restoration would be high priority. **Forest Cluster 5** – Focus on moving mid-seral structure toward late (preferred) or early seral shade-intolerant structure. Focus on areas that are highly roaded, where some road closures could also be accomplished, and where fuel loads have increased significantly. Restoration or production activity which may degrade watersheds with sensitive anadromous fish or narrowly distributed endemic species would be a low priority. **Forest Cluster 6** – Activity in subwatersheds that support strongholds of native fish, and where restoration and production activities may degrade watershed health is a low priority.				

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		F-S9. Standard[S]: Plant blister rust resistant stock, and reduce competition to increase the abundance, diversity, and distribution of western white pine where it occurred naturally.				**F-S9. Standard[S]: within and outside reserves** Plant blister rust resistant stock, and reduce competition to increase the abundance, diversity, and distribution of western white pine where it occurred naturally.
		Rationale *–There has been extensive loss and poor regeneration of western white pine in the moist forest PVG as a result of blister rust infestations (landscape ecology STAR).*				
COLD FOREST						
Not Applicable except for table _ displayed for comparison	Not Applicable except for table _ displayed for comparison	**F-O23. Objective[S]:** In order to restore ecosystem processes, manage vegetative structure, stand density, species composition, patch size, patch distribution, and fuel loading and distribution to a condition where ecosystems sustain, and are resilient to endemic levels of fire, insects and disease. Focus restoration on areas which have the highest potential to maintain viability of and/or attain an increase of whitebark pine. Implement management activities at a rate that approximates the levels described in table 3-12. *See Guidelines F-G32, F-G35-37, F-G39, F-G41-42.*				
		Rationale *– The cold forest PVG exhibits the least amount of departure form historic conditions within the basin, although it does exhibit significant changes in forest structure and composition in some forest clusters. Because of the naturally longer time intervals between fire disturbance events, this PVG has not been as impacted by fire suppression. Primary concern at this time is the loss of whitebark pine and subalpine larch across the cold forest landscape. Forests of most subbasins are only modestly productive.*				
N/A except for table _ displayed for comparison	N/A except for table _ displayed for comparison	**F-O24. Objective[P]:** In areas that are currently within, or have been restored to the DRFC, manage production activities and levels on lands available and suitable for commodity production consistent with maintaining ecosystem processes, including disturbance intensities and frequencies, within the desired range of variability. *See Guidelines F-G32, F-G35-37, F-G39, F-G41-42..*				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
						F-S10. Standard[S]: Within and outside reserves: Plant blister rust resistant stock, and reduce competition to increase the abundance, diversity, and distribution of whitebark pine & subalpine larch where it occurred naturally.
		Rationale *– The landscape ecology assessment (Ch. 2, STARS) found that the primary concern at this time in the cold forest PVG is the loss of whitebark pine and subalpine larch landscape-wide due to the introductions of white pine blister rust.*				

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RANGELANDS (R)						
Not Applicable	Not Applicable	**R-O1. Objective[ ]:** Restore or maintain distribution, frequency, native biodiversity, connectivity and productivity of native rangeland plant communities within the dry shrub, cool shrub and dry grassland PVGs consistent with the disturbance process for that site. Implement management activities at a rate that approximates the levels described in table 3-13.				
Not Applicable	Not Applicable	**R-S1.** Not Applicable				**R-S1. Standard[ ]:** Livestock grazing shall not be allowed in reserves unless livestock grazing use is needed to achieve the intent of the reserve, such as controlling noxious weeds or reducing fine fuels in altered sagebrush steppe. *This standard also applies to all other rangeland objectives.*
Not Applicable	Not Applicable	**R-S2.** Not Applicable				**R-S2. Standard[ ]:** Range improvement projects - such as water developments, fencing, brush control by mechanical means (except prescribed burning), or seeding - shall not be allowed in reserves unless it is needed to achieve the intent of the reserve. *This standard also applies to all other rangeland objectives.*

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For specific levels of activity by alternative and cluster, see tables 3-12 and 3-13. For associated guidelines, see list following this O&S table.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Not Applicable	Not Applicable	**R-O2. Objective[S]:** Minimize conflicts between carnivores (applies to those species whose viability is an issue), and livestock management practices.				Applies outside reserves.
Not Applicable	Not Applicable	**R-O3. Objective[S]:** Reduce the potential for disease transmission between domestic sheep and bighorn sheep.				Applies outside reserves.
Not Applicable	Not Applicable	**R-O4. Objective[S]:** Restore frequency of distribution and ecological integrity of native stands of mountain mahogany, bitterbrush and quaking aspen. Implement management activities at a rate that approximates the levels described in table 3-13				Applies outside reserves.
Not Applicable	Not Applicable	**R-O5. Objective:** Restore native plant community composition, vigor, productivity and ecological integrity of important wild ungulate winter ranges. Implement management activities a rate that approximates the levels described in table 3-13				Applies outside reserves.
Not Applicable	Not Applicable	**R-O6.** Objective: Maintain viability and promote long-term evolutionary process of native terrestrial plant and animal species.				Applies outside reserves.
		R-O7. Objective[ ]: Provide for range wide recovery of federally listed species, federal candidate species and prevent listing of species given special management consideration by land management agencies (that is, USDA Forest Service Sensitive Species and USDI Bureau of Land Management Species of Special Concern).				Applies outside reserves.
		R-O8. Objective[ ]: Manage habitats to ensure long term viability, in full recognition of the ecological importance of special assemblages of species, endemic vertebrates, disjunct vertebrates and vertebrate carnivores, and rare plants. (Refer to Maps XXX)				Applies outside reserves.
		R-O9. Objective[ ]: Manage identified important habitats which contain centers of biodiversity, rarity and endemism as well as disjunct vertebrate carnivores to maintain long term integrity. Refer to map XX.				Applies outside reserves.
		R-O10. Objective[ ]: Maintain multiple ecological domains and options for evolutionary processes by managing peripheral ERUs to maintain habitat integrity to provide for unique species, species assemblages, and ecosystems. (Refer to Maps XXX)				Applies outside reserves.
		R-O11. Objective[ ]: Provide for the continued existence and/or long term viability of local and rare endemics (plants and vertebrates) and disjunct vertebrate species. (Refer to Maps XXX)				Applies outside reserves.
		R-O12. Objective[ ]: Provide for the continued existence and/or long term conservation of; species, species assemblages, and unique ecosystems found in the; Upper Klamath Basin, Owyhee Uplands, and Northern Great Basin. (Refer to Maps XXX)				Applies outside reserves.

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
		R-S3. Standard: As locations of occurrence become specifically known Administrative Units involved should develop ecologically integrated management strategies to conserve species closely associated with one ERU.				
Not Applicable	Not Applicable	**R-O13. Objective[ ]:** Restore cool shrublands, dry shrublands and dry grasslands in range clusters 1,5, and 6, while emphasizing livestock forage in range clusters 1 and 6, Implement management activities at a rate that approximate the levels described in table 3-13. Priority areas for restoration are range-land clusters 1 and 5.	**R-O13. Objective[ ]:** Restore cool shrublands, dry shrublands and dry grasslands in range clusters 1,5, and 6. Implement management activities at a rate that approximate the levels described in table 3-13.	**R-O13. Objective[ ]:** Restore cool shrublands, dry shrublands and dry grasslands in range clusters 1 and 6, while emphasizing forage for livestock production. Priority areas for restoration are rangeland clusters 1 and 6. Implement management activities at a rate that approximate the levels described in table 3-13.	**R-O13. Objective[ ]:** Restore cool shrublands, dry shrublands and dry grasslands in range clusters 1, 5, and 6. Dry shrublands are the highest priority for initial treatment and establishment of experimental studies. Implement management activities at a rate that approximate the levels described in table 3-13.	**R-O13a. Objective[ ]:** within reserves Conserve cool shrublands, dry shrublands, and dry grasslands in range clusters 1, 5, and 6 by primarily emphasizing natural disturbance processes. **R-O13b. Objective[ ]:** outside reserves **Same** as alternative 3.
Not Applicable	Not Applicable	Not Applicable	Not Applicable	**R-O14. Objective[ ]:** Produce livestock forage and conserve cool shrublands, dry shrublands and dry grasslands in rangeland cluster 5. Implement management activities at a rate that approximate the levels described in table 3-13.	Not Applicable	**R-O14. Objective: within reserves** Not applicable **R-O14. Objective: outside reserves** Not applicable

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For specific levels of activity by alternative and cluster, see tables 3-12 and 3-13. For associated guidelines, see list following this O&S table.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Not Applicable	Not Applicable	**R-O15. Objective[ ]:** Produce livestock forage while restoring ground cover, productivity of perennial vegetation and communities that have converted to annual grass-dominated communities within rangeland clusters1 and 6. Implement management activities at a rate that approximate the levels described in table 3-13.	**R-O15. Objective[ ]:** To restore ground cover and productivity of perennial vegetation and converted communities dominated by annuals. Rangeland clusters 1, 5, and 6 have equal priority for treatment. Implement management activities at a rate that approximate the levels described in table 3-13.	**R-O15. Objective[ ]:** Produce livestock forage while restoring ground cover and productivity of perennial vegetation communities that have converted to annual dominated communities, within rangeland clusters 1 and 6. Implement management activities at a rate that approximate the levels described in table 3-13.	**R-O15. Objective[ ]:** To restore ground cover and productivity of perennial vegetation and communities that have converted to domination by annuals. Rangeland clusters 1 and 5 are the highest priority for treatment. Implement management activities at a rate that approximate the levels described in table 3-13.	**R-O15. Objective: within reserves** Not applicable **R-O15. Objective: outside reserves** Not applicable
JUNIPER AND CONIFER ENCROACHMENT						
Not Applicable	Not Applicable	**R-016. Objective[ ]:** To restore rangeland productivity and native biodiversity in areas where juniper and conifer encroachment is reducing rangeland productivity and biodiversity, implement management strategies that manage juniper and conifer population densities on dry and cool shrublands, dry grasslands, riparian and wetland areas. Priority areas are the above vegetation types in range clusters 3, 5, and 6 for the UCRB. Emphasis is on cool shrublands in Rangeland Cluster 1 for the EEIS. Implement management activities at a rate that approximate the levels described in table 3-13.				
Not Applicable	Not Applicable	**R-S4**. Not Applicable				**R-S4. Standard[S]:** There shall be no harvesting of junipers or conifers inside of reserve areas, unless needed to meet the intent of the reserve.
SOIL AND VEGETATION PRODUCTIVITY						
Not Applicable	Not Applicable	**R-017. Objective[S]:** To manage sagebrush densities on dry and cool shrublands so native biodiversity, soil stability and soil productivity are maintained or improved. Priority areas are range clusters 5 & 6 in the UCRB planning area. Implement management activities at a rate that approximate the levels described in Table 3-13.				

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For specific levels of activity by alternative and cluster, see tables 3-12 and 3-13. For associated guidelines, see list following this O&S table.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Not Applicable	Not Applicable	**R-O18. Objective[ ]:** Implement management strategies that promote native biodiversity, soil stability and productivity, and vegetative health and productivity on rangelands with special emphasis during drought years by providing for the following ecosystem functions (1) permit sites to capture water, (2) permit effective water storage, (3) permit release of water such that there is low sediment transport, (4) permit subsurface flow and soil stability, moisture storage, nutrient cycling, and energy flow, (5) permit plants to capture sufficient resources, (6) permit plants to store sufficient resources, and (7) permit plants to retain sufficient cover and litter. Priority areas are dry shrublands and juniper dominated areas in range clusters 5 and 6. Priority areas for the EEIS planning area are dry shrublands and western juniper dominated areas in range cluster 1, 5 & 6. Implement management activities at a rate that approximate the levels described in table 3-13.				
Not Applicable	Not Applicable	**R-S5. Standard[S]:** *Applies to Objective R-O18.* On dry shrublands, there shall be no livestock grazing in a manner that normally would lead to a decrease in soil and vegetative health and productivity during and directly after drought years (about 75% of normal precipitation and below).				
Not Applicable	Not Applicable	**R-O19. Objective[ ]:** Actively manage to restore vegetation structure and species composition to reduce fragmentation and restore linkage zones and increase patch size within and between similar habitats. Reduce fragmentation within shrubland and grass potential vegetation types where special status species occur.				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
VIABILITY AND FEDERALLY LISTED SPECIES (V)						
V-O1. Objective[S]: Contribute to the rangewide recovery of federally listed or proposed species (or subspecies or populations) by restoring habitat quality, quantity, and effectiveness. Continue Idaho conservation effort for development of habitat assessments and strategies.						
V-S1. Standard[P]. Evaluate and implement as appropriate recovery actions according to FS or BLM land-use plans following approved recovery plans. Departure from recovery plans shall be documented in appropriate NEPA analysis and decision notices and records of decision. Develop annual reports on progress and achievements.		**V-S1. Standard[P].** Evaluate and implement as appropriate recovery actions according to FS or BLM land-use plans following approved recovery plans and conservation strategies. Departure from approved recovery plans and conservation strategies shall be documented in appropriate NEPA analysis and decision notices and records of decision. Develop annual reports on progress and achievements.				
V-S2. Standard[S]. In the context of Standard V-S1 for raptor species, subspecies, and populations that are recovering within the ICBEMP project area, apply standards and guidelines from finalized agency documents that have been contributing to recovery.		**V-S2. Standard[S].** In the context of Standard V-S1 for raptor species, subspecies, and populations that are recovering within the ICBEMP project area, apply standards and guidelines from finalized agency documents that have been contributing to recovery, and incorporate new scientific information into adaptive management strategies.				
V-S3. Standard[P]. Implement uniform planning and management procedures by adopting the resource management guidelines and grizzly bear management situations as established in the Interagency Grizzly Bear management (IGBC) Guidelines, 1986. ***This standard applies to the UCRB EIS area only.***						
Not Applicable	Not Applicable	**V-S4. Standard[P].** Within established grizzly bear recovery zones, NEPA analysis for proposed land-disturbing activities should evaluate the conclusions of the IGBC task force report, Interagency Grizzly Bear/Motorized Access Management, July 1994. ***This standard applies to the UCRB EIS area only.***				
Not Applicable	Not Applicable	**V-S5. Standard[P].** In any recovery area where road densities are higher than thresholds in the IGBC task force report (see V-S7), NEPA analysis for additional proposed land-modifying activities should include complete habitat mapping and cumulative effects analysis. ***This standard applies to the UCRB EIS area only.***				

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For specific levels of activity by alternative and cluster, see tables 3-12 and 3-13. For associated guidelines, see list following this O&S table.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Not Applicable	Not Applicable	**V-S6. Standard[P].** NEPA analysis for proposed land-disturbing activities in the Selkirk and Cabinet/Yaak Grizzly Bear ecosystems should evaluate the IGBC strategy for reducing grizzly bear mortalities. ***This standard applies to the UCRB EIS area only.***				
V-S7. Standard[P]. Coordinate annually with States and tribes to provide habitat for big game populations. ***This standard applies to the UCRB EIS area only.***		**V-S7. Standard[P].** Coordinate annually with States and tribes to provide for management of habitat for prey base necessary to support gray wolf recovery. ***This standard applies to the UCRB EIS area only.***				
V-S8. Standard[P]. Implement long-term monitoring protocols that will facilitate use of the Breeding Bird Survey data for management of neotropical migratory birds. Report annually on progress and results.						

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
AQUATIC STRATEGIES Features of Key Components					
BASIC CONCEPT	No region-wide Aquatic Conservation Strategy. Relies on forest and BLM land use plans.	Strategy Incorporates PACFISH/INFISH interim requirements as reflected in Decision Notices[1] and makes them permanent in Alternative 2. Same for Alternative 3, except Standards and Guidelines can also be changed through Watershed Analysis.[2] Activities requiring an EA or EIS will incorporate PACFISH (pages C-3 - C-22) and INFISH (pages E-3 - E-15) interim requirements as the first step. Any changes to those requirements will result from completed watershed analysis.	Strategy represents "refinements" of PACFISH/INFISH made possible by PACFISH/INFISH implementation monitoring and information from the Project's Science Integration Team. Activities requiring an EA or EIS will include watershed-specific RMOs, RMAs and standards and guidelines reflecting completed watershed analysis as the first step. PACFISH/INFISH refined interim standards will be in place and used until watershed analyses are completed. The goal for completion of watershed analyses is three years, but interim standards will not lapse in the event that watershed analyses are not completed.	For forested areas emphasizing timber production the concept reflects "Fish 2000."[3] Rangelands emphasizing livestock production use the concept of Proper Functioning Condition (PFC).[4] Other emphasis areas are the same as Alternatives 4 and 6. - In timber production emphasis areas, project standards are the minimum consistent with state law, to be expanded as indicated by site-specific analysis. - In livestock production emphasis areas, PFC assessment process used to establish objectives. - All other emphasis areas are the same as Alternatives 4 and 6.	Interagency (FWS, NMFS, EPA) Aquatic Conservation Strategy.[5] Same as Alternatives 2 & 3 with additional requirements including allocation of all unroaded areas greater than 1,000 acres as Strongholds for the production of clean water, aquatic and riparian-dependent species.[6]

[1] *Decision Notice and Environmental Assessment for the Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH).* USFS and BLM, Wash., D.C., 1995, and *Decision Notice and Environmental Assessment for the Inland Native Fish Strategy: Interim Strategies for Managing Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, Western Montana, and Portions of Nevada.* USFS, Northern, Intermountain and Pacific Northwest Regions, 1995.Incorporated herein by reference.

[2] *Ecosystem Analysis at the Watershed Scale: The Federal Interagency Guide to Watershed Analysis, Version 2.2.* Incorporated herein by reference.

[3] *National Forest Riparian and Aquatic Habitat Management Strategy (Fish 2000): An Alternative for the Protection and Restoration of Anadromous Fish Habitat in Eastern Oregon and Washington.* Developed by the Northwest Forest Resource Council. Incorporated by reference.

[4] USDI Bureau of Land Management, *Riparian Area Management: Process for Assessing Proper Functioning Condition,* 1993.

[5] Interagency *Aquatic Conservation Strategy.* National Marine Fisheries Service, U.S. Fish and Wildlife Service, Environmental Protection Agency, 1995. Incorporated herein by reference.

[6] "A comprehensive inventory of these areas and their spatial and ecological relationship to the delivery of clean water, aquatic and riparian dependent species is unavailable but is necessary to determine which of the unroaded areas deserve permanent allocation as Strongholds." - Interagency *Aquatic Conservation Strategy.*

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
GOALS (Displayed in the "Desired Range of Future Conditions" for each alternative)	Varies by forest and BLM land use plan.	PACFISH (page C-4) and INFISH (page E-2).	Modified goals from PACFISH, INFISH and Northwest Forest Plan.[7]	PACFISH (C-4) and INFISH (page E-2).	*Interagency ACS* (pages 6-7); follows Northwest Forest Plan.
WATERSHED RESTORATION	Varies by forest and BLM land use plan.	**Alternative 2:** PACFISH (page C- 21, C-22) INFISH (page E-2). **Alternative 3:** Objectives and activity tables contain specific restoration levels and rates	Objectives and activity tables contain specific restoration levels and rates	Objectives and activity tables contain specific restoration levels and rates	*Interagency ACS* (pages 12 - 13). No specific direction included. However, objectives and activity tables contain specific restoration levels and rates.
WATER QUALITY	Varies by forest and BLM land use plan.	New objectives and standards to provide direction on implementation of the Clean Water Act.			
MONITORING	Varies by forest and BLM land use plan.	**Alternative 2:** PACFISH (page C- 22 - C-23) and INFISH (pages E- 15) become permanent. **Alternative 3:** Region and state offices directed to develop implementation, effectiveness and validation monitoring frameworks. Field units directed to monitor RMOs and restoration projects.	Region and state offices directed to develop implementation, effectiveness and validation monitoring frameworks. Field units directed to monitor RMOs and restoration projects.	Region and state offices directed to develop implementation, effectiveness and validation monitoring frameworks. Field units directed to monitor RMOs and restoration projects.	Region and state offices directed to develop implementation, effectiveness and validation monitoring frameworks. Field units directed to monitor RMOs and restoration projects.
KEY/ PRIORITY WATERSHEDS	None	**Alternative 2:** PACFISH (page C- 19) INFISH (page E-13 & 14). **Alternative 3:** Watershed Categories replace Key/Priority Watersheds.	Watershed Categories replace Key/Priority Watersheds.	Watershed Categories replace Key/Priority Watersheds, but are subject to Emphasis Area direction.	None, but concept of "Strongholds" allocated to riparian and aquatic recovery and restoration *Interagency ACS* (page 9).

[7]USFS and BLM, 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl/Standards and Guidelines for Management of Habitat for Late Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl. Interagency Supplemental EIS Team Portland, Or.

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
WATERSHED ANALYSIS (Separate from the multi-scale ecosystem analysis applicable in Alternatives 3-7).	None	**Alternative 2:** PACFISH (page C- 19 and C-21) INFISH (page E-14 and E-15). Intent of Watershed Analysis is a secondary emphasis, and is to refine RHCA widths and RMOs. **Alternative 3:** Intent of Watershed Analysis is a secondary emphasis, and is to refine RHCA widths, RMOs and standards and guidelines.	Watershed Analysis is a primary emphasis to determine watershed-specific RMA widths, RMOs and standards and guidelines.	In timber emphasis areas, Conduct a watershed-scale riparian function and project-specific assessment, to be expanded as indicated by site-specific analysis. In livestock emphasis areas, Watershed Analysis procedures incorporate PFC as an important consideration, and objectives are established to achieve PFC. For all other emphasis areas, same as Alternatives 4 and 6.	Same as Alternative 2: Intent of Watershed Analysis is a secondary emphasis, and is to refine RHCA widths and RMOs.
INTERIM RMOs	None	PACFISH (page C-6) INFISH (page E-4). Instream attributes expressed as single values.[8]	Appendix G, Pages ____. Instream and riparian attributes expressed in ranges of values stratified by slope class and ERU.[9]	None in timber or livestock emphasis areas (See Page 23 of Fish 2000).	*Interagency ACS* (pages 8-9)[10]
INTERIM RHCAs	Varies by forest and BLM land use plan.	PACFISH (page C-8) INFISH (pages E-5 & 6). Fixed minimum widths based on fish and water presence. For rangelands, fixed on width of 100-year floodplains.	Appendix G, Pages ____. In forested environments, widths vary based on inner and outer riparian zones which reflect instream and riparian functions and processes. In rangelands, widths vary by floodprone area and stream type.	In timber emphasis areas see page 18 of Fish 2000. None in livestock emphasis areas. In all other emphasis areas, same as Alternatives 4 & 6.	Same as Alternatives 2 & 3. *Interagency ACS* (pages 9-10). Adds concept of "Strongholds" to RHCAs, and allocates both to riparian and aquatic recovery and restoration.

[8] The data set from which the PACFISH/INFISH RMOs were developed was limited to 200 streams, and included streams outside the Interior Columbia River Basin.

[9] The data set (2000 streams) was much larger than that for PACFISH/INFISH, and was rigorously analyzed.

[10] RMOs were "developed based on those from PACFISH, the NMFS PACFISH Biological Opinion (BiOp) and the NMFS LRMP BiOp. These in turn were based on the biological habitat requirements of fish and aquatic resources (Rhodes et al., 1994) or based on conditions in undeveloped watersheds as a benchmark (Peterson et al., 1993)."

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
INTERIM PROJECT STANDARDS AND GUIDELINES	Varies by forest and BLM land use plan.	**Alternative 2:** PACFISH (pages C- 9 - C-18) and INFISH (pages E-6 - E-13) become permanent. **Alternative 3:** PACFISH (pages C- 9 - C-18) and INFISH (pages E-6 - E-13) are interim until watershed analysis completed.	Same as Alternative 3, except for changes in timber, fire, roads and recreation management where different standards apply in zones One and Two.	In timber emphasis areas see page 18 of Fish 2000. In livestock emphasis areas, attain PFC. In all other emphasis areas, same as Alternatives 4 & 6.	*Interagency ACS* (pages 14 - 23).

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
AQUATIC STRATEGIES (A)					
Goals					
Varies by forest and BLM land management plan.	See Desired Range of Future Conditions for each alternative.				
Watershed and Riparian Restoration Management					
Varies by forest and BLM land management plan. Ranges in Tables 3-12 and 3-13 are displayed for comparison.	Varies by forest and BLM land management plan and as amended by the Decision Notices for PACFISH and INFISH. Ranges in Tables 3-12 and 3-13 are displayed for comparison.	**A-O1. Objective:** Restore watershed, soil productivity, stream channel, riparian, and soil integrity where functions are at levels that do not allow ecosystem sustainability and resiliency. Implement watershed restoration activities at the levels described in Tables 3-12 and 3-13. *See Standards A-S1-S3. See Guidelines A-G___.*			
		A-O2. Objective: Maintain or improve forest and rangeland riparian health and integrity, including appropriate conditions for microclimate, streamflow, groundwater flow, channel morphology, floodplain function, and vegetation (composition, pattern, and structure) to achieve conditions that support federally listed species, species of special concern, other aquatic and riparian dependent species, and designated beneficial uses at the levels described in Tables 3-12 and 3-13. *See Standards A-S1-S3. See Guidelines A-G__.*			
		A-O3. Objective: Manage rangeland riparian areas to maintain or improve conditions towards vegetation structure, age, and composition consistent with the potential for that site at the levels described in Tables 3-12 and 3-13. *See Standards A-S1-S3. See Guidelines A-G___.*			
		A-S1. Standard: Grazing intensity and season of use shall be managed to allow vegetation to recover before being regrazed to encourage plant vigor, regrowth, and energy storage.			
		A-S2. Standard: Monitoring plans shall be integrated with grazing management strategies for riparian areas within 10 years.			
		A-S3. Standard: Attainment of Proper Functioning Condition (Riparian Area Management, Process for Assessing Proper Functioning Condition, Technical Report 1737-9, 1993) should be required as a minimum channel and riparian condition for all stream systems. Where stream systems are not meeting Proper Functioning Condition, management activities should be modified to attain Proper Functioning Condition.			
Water Quality					
A-O4. Objective: Maintain water quality where it is presently high, and improve water quality where it does not meet State water quality standards due to influences from Forest Service- or BLM-administered lands. *See Standards A-S4-S6. See Guideline A-G___.*					

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
Not Applicable	Not Applicable	**A-S4. Standard:** No objective, standard, or guideline in a Forest Service Land & Resource Mgt. Plan or a BLM Resource Mgt. Plan shall be considered equivalent to a State Water Quality Standard unless said objective, standard, or guideline has been specifically incorporated by the State into its applicable water quality laws, regulations, or standards in which the Forest or BLM plan is in effect.			
A-S5. Standard. Within watersheds where there are water quality limited segments or water bodies as defined by the Clean Water Act (Section 303(d)), management actions shall be implemented in compliance with State-developed water quality programs and strategies with the intent to restore water quality to levels which meet State Water Quality Standards.					
A-S6. Standard. Within watersheds that are identified as High Quality Waters or Outstanding Resource Waters (waters which exceed water quality standards), comply with applicable State anti-degradation requirements.					
Monitoring and Inventory					
Varies by forest and BLM land management plan.	Varies by forest and BLM land management plan and as amended by the Decision Notices for PACFISH and INFISH.	**A-O5. Objective:** Monitor progress toward attainment of long-term health and integrity of watershed, aquatic, riparian, and soil resources. *See Standards A-S7-S10. See Guidelines A-G___.*			
		A-O6. Objective: Collect and inventory data in a consistent, retrievable, and updateable format to acquire essential information about ecological processes and conditions, causal mechanisms, and inherent capabilities and limitations, that are linked across different scales of time and space, and are used to address issues identified by watershed and other scale analyses. *See Standards A-S7-S10. See Guidelines A-G___.*			
		A-S7. Standard: Regional and State Offices shall develop implementation, effectiveness, and validation monitoring frameworks for the Upper Columbia River Basin and Eastside EIS areas.			
		A-S8. Standard: Regional and State Offices should oversee and ensure monitoring programs at various scales and report results on an annual basis. At a minimum, key habitat and watershed processes identified in Watershed Management Objectives and Riparian Management Objectives and implementation and effectiveness of watershed restoration should be reported and assessed to determine progress in meeting objectives.			
		A-S9. Standard: Regional and State Offices shall cooperate with Federal agencies and State, and tribal governments which have Clean Water Act authority to develop consistent protocols for methodologies in collection, transmission, and sharing of monitoring data.			
		A-S10. Standard: Monitoring shall be conducted by field units to determine if Watershed or Riparian Management Objectives are being met. If it is determined that objectives are not being met due to management actions, then management actions should be modified to those more likely to achieve objectives. If analysis indicates that Watershed or Riparian Management Objectives are not being met due to natural conditions or to processes or actions outside of management control, then new objectives should be developed on the basis of new information.			

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
Key Watersheds, Watershed Categories, and Emphasis Areas – Use of Watershed Analysis					
Varies by forest and BLM land management plan.	Varies by forest and BLM land management plan and as amended by the Decision Notices for PACFISH and INFISH. See Appendix ___ for description.	Watershed Categories 1, 2, 3 as defined in the Scientific Assessment and discussed in Chapter Two of this EIS apply. See Appendix ___ for description.		Emphasis areas as defined in this Alternative apply. See Appendix ___ for description. Outside timber production and livestock production emphasis areas same as Alternatives 4 and 6.	Not Applicable
Not Applicable	Not Applicable	Not Applicable		**A-O7. Objective:** Inside timber production and livestock production emphasis areas, conserve remaining native aquatic species strongholds and high quality habitat and water for federally listed threatened, endangered, and candidate aquatic species while maximizing production activities.	Not Applicable
				Outside timber production and livestock production emphasis areas:	
Not Applicable	Not Applicable	**Category 1 Watersheds A-O8. Objective:** Conserve and promote watershed health, soil function, aquatic habitat integrity and connectivity, and water quality within Category 1 Watersheds. Protect, maintain, and restore designated critical habitat and designated habitat within recovery zones for federally listed aquatic species. See Tables 3-12 and 3-13 for restoration rates by cluster. *See Standards A-S11-13. See Guidelines A-G___.*			Not Applicable

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards; S=Substance, P=Process

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
Not Applicable	Not Applicable	**Category 2 Watersheds A-O9. Objective:** Conserve remaining native aquatic species strongholds and high quality habitat and water, restore depressed native aquatic species populations, and restore connectivity in watersheds where populations of native aquatic species are presently fragmented because of habitat loss or disruption. Improve watershed health and integrity, soil function, and water quality in areas where natural watershed function and condition have been degraded. Protect, maintain, and restore designated critical habitat and designated habitat within recovery zones for federally listed aquatic species. See Tables 3-12 and 3-13 for restoration rates by cluster. *See Standards A-S11-13. See Guidelines A-G___.*			Not Applicable
Not Applicable	Not Applicable	**Category 3 Watersheds A-O10. Objective:** Conserve remaining native aquatic species strongholds and high quality habitat and water for federally listed threatened, endangered, candidate aquatic species and aquatic species of concern, while preserving future options for watershed and aquatic restoration. Protect or improve water quality to sustain designated beneficial uses. Protect, maintain, and restore designated critical habitat and designated habitat within recovery zones for federally listed aquatic species. See Tables 3-12 and 3-13 for restoration rates by cluster. *See Standards A-S11-13. See guidelines A-G___.*			Not Applicable
Not Applicable	**A-S11. Standard:** Ecosystem Analysis shall be used as required by interim project standards.	**A-S11. Standard:** In Category 1 Watersheds, Ecosystem Analysis shall be completed prior to any activity that requires an Environmental Assessment or Environmental Impact Statement until such time as Region and State Offices jointly develop and implement a pre-project water-scale effect screen that would exempt some activities from Ecosystem Analysis.		**A-S11. Standard:** In timber production emphasis areas, conduct a watershed-scale riparian function and project-specific assessment as described by Fish 2000 prior to timber harvest activities.	**A-S11. Standard:** Same as Alternative 2.
Not Applicable		**A-S12. Standard:** In Category Two and Three Watersheds, Ecosystem Analysis should be performed prior to any activities that require an EA or EIS. If Ecosystem Analysis is not completed, then interim project standards, interim RMAs and interim RMOs shall apply as defined for the Alternatives in the proceeding sections.		**A-S12. Standard:** In livestock production emphasis areas, the Proper Functioning Condition assessment procedure should beused in establishing objectives during the Allotment Management Plan revision process.	
Not Applicable		**A-S13. Standard:** In Category Three watersheds not containing threatened, endangered or candidate species, interim RMAs and RMOs can be adjusted with site-specific data.		**A-S13. Standard:** For other emphasis areas see Alternative 4 and 6 interim project standards, interim RMAs, and interim RMOs and Standards A-S11-S13.	

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
Interim Riparian Management Objectives (RMOs): Definitions and Intent - Detailed description in Appendix G for Alternatives 2-7.					
Varies by forest or BLM land use plan.	Landscape-scale interim RMOs describing good habitat for native fish were developed, using stream inventory data for pool frequency, large woody debris, bank stability and lower bank angle, and width to depth ratio. Applicable published and non-published scientific literature was used to define favorable water temperatures. All of the described features may not occur in a specific segment of stream within a watershed, but all generally should occur at the watershed scale for stream systems of moderate to large size (3rd to 6th order).		RMOs describing natural to near natural aquatic habitat conditions were developed through the Project's Science Integration Team, using stream inventory data for large pool and pool frequency, large woody debris, bank stability, and pool width to depth ratio. Instream values are displayed in ranges to account for variability of streams within the interior Columbia River Basin. Applicable published and non-published scientific literature was used to define favorable water temperatures. A riparian vegetation RMO was also developed. All of the described features may not occur in a specific segment of stream within a watershed, but all generally should occur at the watershed scale for stream systems of moderate to large size (3rd to 6th order).	*Timber emphasis areas within Forested environments:* Appropriate goals and objectives must be developed on a site-specific basis. Process-based locally developed RMOs, where channels and their key habitat characteristics are measured in the watershed of concern. These measures are then compared with those from streams of similar channel and watershed geomorphic character, which are judged to fully support the waters' beneficial uses, in order to produce "reference conditions. Determination of "fully support" must include documentation of assumptions on which judgements are based, allowing for revision over time as new information becomes available.	RMOs provide a measure of whether the land management practices are providing the watershed and habitat characteristics which will support aquatic species. If conditions at the watershed scale or site-specific scale are below these criteria then it must determined why the watershed is not meeting objectives. Where land management activities are the causal agent for not meeting the riparian management objectives then a plan to remedy the problem needs to be developed.
	The interim RMOs for stream channel conditions provide the criteria against which attainment or progress toward attainment of the riparian goals is measured. Interim RMOs provide the target toward which agency managers aim as they conduct resource management activities across the landscape. It is not expected that the objectives would be met instantaneously, but rather would be achieved over time.			Riparian Management Objectives provide guidance to project design and monitoring.	Riparian Management Objectives (RMOs) provide measurable criteria against which attainment, or progress toward attainment, of the Aquatic and Riparian Goals are measured.

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	However, the intent of interim RMOs are not to establish a ceiling for what constitutes good habitat conditions. Actions that reduce habitat quality, whether existing conditions are better or worse than objective values, are inconsistent with the purpose of this interim direction.			*Livestock emphasis areas within rangeland environments:* RMOs are to be based on the definition of "Proper Functioning Condition." Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to: a) dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; b) filter sediment, capture bedload, and aid floodplain development; c) improve flood-water retention and ground-water recharge; d) develop root masses that stabilize stream banks against cutting action; e) develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; f) and support greater biodiversity.	The method of adjusting the RMOs to particular watersheds is through Watershed Analysis; if interagency peer reviewed watershed analysis shows that habitat recovery is enhanced and not retarded by adjustment, or is that these RMOs are not attainable within the watershed, then these RMOs should be adjusted according to the findings of the watershed analysis.
				For forested and rangeland environments outside timber and livestock emphasis areas: Same as Alternatives 4 and 6.	

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
Interim Riparian Management Areas (RHCAs or RMAs) Width Definitions - Detailed description in Appendix G for Alternatives 4 and 6.					
Varies by forest and BLM land use plan.	**Fish-bearing streams:** Riparian Habitat Conservation Areas (RHCAs) consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet, including both sides of the stream channel), whichever is greatest. **Permanently flowing non-fish-bearing streams:** RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year flood plain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet, including both sides of the stream channel), whichever is greatest.		**Forested Environments:** Riparian Management Areas (RMAs) for permanently flowing streams (both fish bearing and non-fish bearing) consist of the stream and the area on either side of the stream with a width equal to the height of one site potential tree making up Zone One, and an additional width of a second site potential tree, or the distance required to buffer the stream from nonchannelized sediment, whichever is greater, making up Zone Two. **Range Environments:** Riparian Management Areas (RMAs) for permanently flowing streams (both fish bearing and non-fish bearing) consist of the stream and the area on either side of the stream with a width equal to the flood-prone width based on stream-type as defined in Rosgen (1994).	***In timber emphasis areas:*** **Forested Environments:** Riparian Habitat Conservation Areas (RHCAs) consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the boundary defined by identified individual stream input processes. ***In livestock emphasis areas:*** **Range Environments:** none. ***All areas outside timber and livestock emphasis areas:*** Same as Alternatives 4 and 6.	Standard RHCA definition same as Alternatives 2 and 3.
	Ponds, lakes, reservoirs, and wetlands greater than 1 acre: RHCAs consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake, whichever is greatest.				Same as Alternatives 2, 3, 4 and 6.

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas: This category includes features with high variability in size and site-specific characteristics. At a minimum the RHCAs must include: a. the extent of landslides and landslide-prone areas, b. the intermittent stream channel and the area to the top of the inner gorge, c. the intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation, and d. the area from the edges of the stream channel, wetland, landslide, or landslide-prone area to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest;		**Seasonally flowing or intermittent streams:** Riparian Management Areas (RMAs) for forested environments consist of the stream and the area on either side of the stream with a width equal to the height of one-half site potential tree making up Zone One, and an additional width of one-half site potential tree, making up Zone Two. **Landslide Prone Areas:** Landslide prone areas are added to RMAs as indicated by landslide prone analysis.		Same as Alternatives 2 and 3.
Interim Project Standards					
Timber Management					
Varies by forest and BLM land use plan.	**Standard:** RMAs shall not be included in the land base used to determine the Allowable Sale Quantity at the time of plan revision, but any volume harvested can contribute to the timber sale program.			**Standard:** Same as Alternatives 2, 3, 4 and 6, except not applicable in timber emphasis areas.	**Standard:** Same as Alternatives 2, 3, 4 and 6. Also applies to "Strongholds" defined as all unroaded areas greater than 1,000 acres allocated for the production of clean water, and aquatic and riparian dependent species.

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	Standard: Prohibit timber harvest, including fuelwood cutting, in RHCAs (Zone One) except as described below: a. Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuelwood cutting in RHCAs only where present and future woody debris needs are met, where cutting would not retard or prevent attainment of other RMOs and where adverse effects can be avoided to aquatic resources. b. Apply silvicultural practices for RHCAs to acquire desired vegetation characteristics where needed to attain RMOs. Apply silvicultural practices in a manner that does not retard attainment of RMOs and that avoids adverse effects on aquatic resources.		**Standard:** Zones One and Two. The primary purpose of RMAs is to protect, maintain or restore the riparian and instream processes and functions. Vegetation management may occur in the RMAs only for the purpose of achieving these functions and processes and the intent of each Zone. RMAs are not intended as important sources of commercial timber. *(See Appendix G for discussion of processes, functions, and intents).* **Standard:** Zone One. Large live, dying and dead (standing and down) trees are recognized for their importance in supporting riparian functions and processes. Vegetation management will be used only to achieve or maintain mature forest conditions adapted to non-lethal, lethal, or mixed fire regimes and other natural disturbances characteristic of the site. Management will minimize ground disturbance and have no predictable measurable instream effects.	*In timber emphasis areas:* **Standard:** There shall be no timber harvest within 20 ft of fish-bearing streams. Only selective timber harvesting is permitted between 20 and 100 ft of fish-bearing streams. a. In riparian areas adjacent to perennial and intermittent streams, trees not required for present or future shade and temperature considerations may be selectively harvested. The maximum area that shall be considered for shade and temperature control is 75 ft from the active channel margin. b. In riparian areas adjacent to perennial and intermittent streams, trees not required for large woody debris recruitment may be selectively harvested. The maximum area that should be considered for large woody debris recruitment is one effective tree height around all active channel migration zones.	**Standard:** Prohibit timber harvest, including fuel wood cutting in RHCAs and Strongholds, except as described below: a. Allow timber extraction including fuel wood cutting from RHCAs only where watershed analysis shows that such projects will be neutral or beneficial to water quality, fish and other riparian dependant resources. Watershed analysis should show compelling scientific and logical reasons to assure that present and future coarse woody debris needs are met, cutting would not prevent attainment of Riparian Objectives or Desired Habitat Standards, and would not result in adverse effects to clean water, fish and other aquatic resources. b. In RHCAs, apply only silvicultural practices to control stocking, reestablish and culture stands, and acquire desired vegetative conditions necessary to attain Riparian Objectives and meet Desired Habitat Standards.

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
			Standard: Prescribed fire or thinning may be used in Zone Two only to move stands toward mature forest conditions adapted to non-lethal, lethal, or mixed fire regimes where there is a threat of transmitting lethal fire conditions to Zone One. Management will minimize ground disturbance and have no predictable measurable instream effects, and maintain forest canopy sufficient for microclimate and riparian dependent species.	c. To protect nutrient budgets in riparian areas adjacent to perennial and intermittent streams, there shall be no burning, piling of slash, or soil disturbance within 100 feet of active channel margins. d. To minimize sediment introduction into aquatic systems, there shall be no ground-skidding equipment within 50 ft of active channel margins in areas adjacent to perennial and intermittent streams.	c. Do not harvest any tree species older than 150 years or with a diameter at breast height (dbh)of greater than 20 inches. This is prudent within RHCAs. Trees, other than hazard trees, greater than 150 years of age, or with a dbh greater than 20 inches should not be cut in RHCAs. Hazard trees that fit this description may be cut, but they should be left on-site.
			Standard: Upslope of Zone Two use a variety of tools including silvicultural practices to create vegetation pattern, structure and composition for both upslope and Zone Two to lessen the risk of uncharacteristic disturbances from fire, insect, and disease. Silvicultural practices within Zone Two and related uplands should be designed to achieve desired vegetation characteristics consistent with RMOs while not creating or exacerbating additional risks.	e. Where appropriate, silvicultural treatments can be applied to reduce the risk of large wildfires in riparian areas that have fuel loading levels greater than expected for the biophysical setting. *In all other forested environments outside timber emphasis areas:* Same as Alternatives 4 and 6.	**Standard:** For all timber sales evaluate equivalent clearcut area (ECA) in the watersheds as described in McIntosh et al, 1994. If the ECA exceeds 15% of the potentially forested area, a watershed analysis should be conducted prior to initiating actions that would increase ECA. Actions that would increase ECA should proceed after watershed analysis only if there is low risk of adversely affecting riparian-dependent species habitat and if attainment and maintenance of ecological goals and Riparian Objectives will not be retarded or prevented.

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
Roads Management					
Varies by forest and BLM land use plan.				*In all other forested environments outside timber emphasis areas:*	**Road Definition:** Because any area used by motorized vehicles is prone to erosion and can cause increased sedimentation, or otherwise affect the hydrologic or sediment regimes within a watershed, special standards must apply to road construction and maintenance. Thus, some travelways commonly called trails qualify as roads and are subject to the following Standards.
	Standard: Cooperate with Federal, Tribal, State, and county agencies, and cost-share partners to achieve consistency in road design, operation, and maintenance necessary to attain RMOs.				
	Standard: For each existing or planned road, meet the RMOs and avoid adverse effects to aquatic resources by: a. Completing watershed analyses prior to construction of new roads or landings in RHCAs.		**Standard:** For each existing or planned road, meet the RMOs and avoid adverse effects to aquatic resources by: a. Allowing roads in RMAs only for the purpose of minor stream crossings which have no predicted measurable effect or cumulative effect. Roads paralleling RMAs are prohibited. All minor stream crossings and landings will be consistent with RMOs.	**Standard:** For each existing or planned road, meet the RMOs and avoid adverse effects to aquatic resources by: a. Allowing roads in RMAs only for the purpose of minor stream crossings which have no predicted measurable effect or cumulative effect. Roads paralleling RMAs are prohibited. All minor stream crossings and landings will be consistent with RMOs.	**Standard:** For each existing or planned road, meet the Riparian Management Objectives and Aquatic and Riparian Goals, avoid adverse effects on riparian-dependent species by: a. completing peer reviewed Watershed Analyses prior to construction of new roads or landings in RHCAs. Construct roads and landings only if Watershed Analysis indicates that the antidegradation standard is met.

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	b. Minimize road and landing locations in RMAs. c. Initiate development and implementation of a Road Management Plan or a Transportation Management Plan. At a minimum, address the following items in the plan: 1. Road design criteria, elements, and standards that govern construction and reconstruction, 2. Road management objectives for each road, 3.Criteria that govern road operation, maintenance, and management, 4. Requirements for pre-, during- and post-storm inspections and maintenance, 5. Regulation of traffic during wet periods to minimize erosion and sediment delivery and accomplish other objectives, 6. Implementation and effectiveness monitoring plans for road stability, drainage, and erosion control, and 7. Mitigation plans for road failures.				
	d. Avoid sediment delivery to streams from the road surface. Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is infeasible or unsafe. Route road drainage away from potentially unstable stream channels, fills, and hillslopes. e. Avoid disruption of natural hydrologic flow paths. f. Avoid side casting of soils or snow. Side casting of road material is prohibited on road segments within or abutting RMOs.				
	Determine the influence of each road on the Riparian Management Objectives. Meet Riparian Management Objectives and avoid adverse effects on aquatic resources by: a. Reconstructing road and drainage features that do not meet design criteria or operation and maintenance standards, or that have been shown to be less effective than designed for controlling sediment delivery, or that retard attainment of RMOs, or do not protect priority watersheds from increased sedimentation. b. prioritizing reconstruction based on the current and potential damage to aquatic resources and their priority watersheds, the ecological value of the riparian resources affected, and the feasibility of options such as helicopter logging and road relocation out of RMAs. c. closing and stabilizing or obliterating, and stabilizing roads not needed for future management activities. Prioritize these actions based on the current and potential damage to aquatic resources in priority watersheds, and the ecological value of the riparian resources affected.				
	Standard: Improve existing culverts, bridges, and other stream crossings to accommodate a 100 year flood, including associated bedload and debris, where those improvements would/do pose a substantial risk to riparian conditions. Substantial risk improvements include those that do not meet design and operation maintenance criteria, or that have been shown to be less effective than designed for controlling erosion, or that retard attainment of RMOs. Base priority for upgrading on risks and the ecological value of the riparian resources affected. Construct and maintain crossings to prevent diversion of streamflow out of the channel and down the road in the event of crossing failures.				
	Standard: Provide and maintain fish passage at all crossings of existing and potential fish-bearing streams.				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
				In timber emphasis areas: **Standard:** To minimize sediment introduction to perennial and intermittent streams, there should be no roads constructed within 150 ft of active channel margins. For existing and necessary new roads withing 150 ft of active channel margins, management actions should be taken to mitigate erosion, stabilize fills, maintain culverts and drainage systems, and to minimize subsoil disturbance.	**Standard:** For proposed/new roads, where road density is greater than 2 miles/square mile, reduce road mileage and emphasize road closure, obliteration, and revegetation. McCammon (1993) described water and sediment delivery effects associated with road densities greater than 2 miles/square mile.
				Standard: To protect the natural sediment regime, management actions should not: (1) increase the incidence of mass movements, bank erosion, and sediment introduction into stream systems from resulting from human actions (e.g. ground-disturbing activities, road building and maintenance); and (2) protect natural sources of sediment introduction into stream channels.	
Grazing Management					
Varies by forest and BLM land use plan.				*All other rangeland environments outside livestock emphasis areas:*	**Standard:** Eliminate livestock access to spawning reaches of streams during spawning and incubation periods.

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	Standard: Modify grazing practices (e.g., accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of RMOs or are likely to adversely affect aquatic resources. Suspend grazing if adjusting practices is not effective in meeting RMOs.				**Standard:** Suspend grazing in RHCAs adjacent to streams that do not meet Desired Habitat Standards and sediment delivery standards if grazing is shown to be a contributing factor to the diminishment of Desired Habitat Standards and sediment delivery standards or is a factor that limits the rate of habitat recovery.
	Standard: New livestock handling and/or management facilities shall be located outside of RMAs. For existing livestock handling facilities inside RMAs, assure that facilities do not prevent attainment of RMOs. Relocate or close facilities where these objectives cannot be met.				
	Standard: Limit livestock trailing, bedding, watering, loading, salting, and other handling efforts shall be restricted to areas and times that will not retard attainment of RMOs or adversely affect aquatic resources.				**Standard:** Suspend cattle grazing in RHCAs adjacent to designated critical habitat that: 1) contain perennially saturated meadows with non-cohesive soils; and 2) only contain shrub, grass, and forb vegetation.
	Standard: Adjust wild horse and burro management to avoid impacts that prevent attainment of RMOs or adversely affect aquatic resources.				
					Standard: Only allow grazing in those areas where livestock can be prevented from entering unpermitted riparian areas.
				In livestock emphasis areas: **Standard:** Attainment of Proper Functioning Condition shall be a minimum objective for all Riparian Management Areas.	**Standard:** Suspend grazing where protective measures cannot be implemented because of: terrain; needed improvements (e.g., off-stream watering holes, or fencing) have not been constructed; administration, funding, or monitoring; or lack of permittee cooperation.

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
Minerals Management					
Varies by forest and BLM land use plan.	**Standard:** Avoid adverse effects to aquatic resources from mineral operations. If a Notice of Intent indicates a mineral operation would be located in a RHCA/RMA, consider the effects of the activity on aquatic resources in the determination of significant surface disturbance pursuant to 36 CFR 228.4 for the USFS and 43 CFR 3809.2-2 for the BLM. For operations in an RHCA/RMA ensure operators take all practicable measures to maintain, protect, and rehabilitate fish and wildlife habitat which may be affected by the operations. When bon is required, consider (in the estimation of bond amount) the cost of stabilizing, rehabilitating, and reclaiming the area of operations.				**Standard:** All new mining operations (ore body, waste rock, spent ore, tailing, roads, milling, chemical storage, housing, sand, gravel, etc.) must be located outside of Strongholds (unroaded areas) and RHCAs and must comply with all other Standards.
	Standard: Locate structures, support facilities, and roads outside RMAs. Where no alternative to siting facilities in RMAs exists, locate and construct the facilities in ways that avoid impacts to RMAs and streams and adverse effects on aquatic resources. Where no alternative to road construction exists, keep roads to the minimum necessary for the approved mineral activity. Close, obliterate and revegetate roads no longer required for mineral or land management activities.				**Standard:** If on-going mining operations are located in drainage that do not meet Desired Habitat Standards and sediment delivery standards and if mining is shown to be a contributing factor to the diminishment of Desired Habitat Standards and sediment delivery standards or is a factor that limits the rate of habitat recovery, then suspend special use permits to mining operations, as necessary, until problems are corrected.
	Standard: Prohibit solid and sanitary waste facilities in RMAs. If no alternative to locating mine waste (waste rock, spent ore, tailings) facilities in RMAs exists, and releases can be prevented and stability can be ensured, then: a. Analyze the waste material using the best conventional sampling methods and analytic techniques to determine its chemical and physical stability characteristics. b. Locate and design the waste facilities using the best conventional techniques to ensure mass stability and prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long term, prohibit such facilities in RMAs. c. Monitor waste and waste facilities to confirm predictions of chemical and physical stability, and make adjustments to operations as needed to avoid adverse effects to inland aquatic resources and to attain Riparian Management Objectives.				**Standard:** Toxic chemical storage and transfer locations must be in properly lined areas and must be able to hold at least 1.5 times their storage capacity. All must have proper leak detection equipment and alarms.

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	d. Reclaim and monitor waste facilities to assure chemical and physical stability and revegetation to avoid adverse effects to inland aquatic resources, and to attain the Riparian Management Objectives. e. Require reclamation bonds adequate to ensure long-term chemical and physical stability and successful revegetation of mine waste facilities.				**Standard:** Transport of toxic chemicals along aquatic and riparian-dependent species migration, rearing, and spawning streams and their tributary streams should be either eliminated or the risk of a toxic spill reduced to an insignificant level.
	Standard: For leasable minerals, prohibit surface occupancy within RMAs for oil, gas, and geothermal exploration and development activities where contracts and leases do not already exist, unless there are no other options for location and Riparian Management Objectives can be attained and adverse effects to aquatic resources can be avoided. Adjust the operating plans of existing contracts to (1) eliminate impacts that prevent attainment of Riparian Management Objectives and (2) avoid adverse effects to native aquatic species.				**Standard:** New mines that have the potential to produce acid rock drainage (either in the ore body, pregnant ore storage area, waste rock storage area, or mine tailings storage area) should not be permitted. On-going mines that have the potential to produce acid rock drainage must change their operation to avoid this problem. Otherwise these mines should have their special use permits revoked.
	Standard: Permit sand and gravel mining and extraction within RMAs only if no alternatives exist, if the action(s) would not retard or prevent attainment of Riparian Management Objectives, and adverse effects to native aquatic species can be avoided.				**Standard:** All mining operations must have a completed restoration plan and be bonded sufficient to finance restoration such that impacted aquatic habitats may be reestablished.
	Standard: Develop inspection, monitoring, and reporting requirements for mineral activities. Evaluate and apply the results of inspection and monitoring to modify mineral plans, leases, or permits as needed to eliminate impacts that prevent attainment of Riparian Management Objectives and avoid adverse effects on native aquatic species.				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
Fire Suppression/Fuels Management					
Varies by forest and BLM land use plan.	**Standard:** Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of Riparian Management Objectives, and to minimize disturbances of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate or be damaging to long-term ecosystem function or aquatic resources.				Impacts from suppression techniques and fire suppression personnel are to be minimized or avoided in areas where there is potential to adversely effect listed salmon, other riparian-dependent species, and their habitats. Every effort should be made to minimize or avoid stream channel and stream course disturbances, sedimentation, and actions that will result in increased water temperature.
	Standard: Locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of RMAs. If the only suitable location for such activities is within the RMAs, an exemption may be granted following a review and recommendation by a resource advisor. The advisor would prescribe the location, use conditions, and rehabilitation requirements, with avoidance of adverse effects to inland aquatic resources a primary goal. Use and interdisciplinary team, including a fishery biologist, to predetermine incident base and helibase locations during presuppression planning.				**Standard.** a. Tractors are not to be used, except for the protection of life and property. b. Other than hazard trees, trees are not to be felled within RHCAs. c. Reopening naturally revegetated roads is to be avoided when reconstruction of road portions within RC would be required.

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	Standard: Avoid delivery of chemical retardant, foam, or additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following a review and recommendation by a resource advisor and a fishery biologist, when the action agency determines an escape fire would cause more long-term damage to fish habitats than chemical delivery to surface waters.				a. Using fire retardant chemicals and fuels is to be avoided when potential for stream contamination exists. b. The application of retardant within critical habitat or near live streams is to be avoided. Fire retardant or foam is not to be dropped directly into streams or within designated critical habitat. c. Water is not to be pumped directly from streams if chemical products are going to be injected into a pump or pumping system. If chemicals are needed, a "fold-a-tank" is to be used from which to pump water.
	Standard: Design prescribed burn projects and prescriptions to contribute to the attainment of the Riparian Management Objectives.				d. Refueling activities, fuel storage, and fuel trucks are to be located outside RHCAs.
	Standard: Immediately establish an emergency team to develop a rehabilitation treatment plan to attain Riparian Management Objectives and avoid adverse effects on inland aquatic resources whenever RMAs are significantly damaged by a wildfire or a prescribed fire burning out of prescription.				e. Helicopter buckets are not to be dipped into streams where juvenile or adult salmon or other listed fish may be present.
					f. Helicopter buckets are to be dipped only after chemical injection systems (storage containers) have been removed from the bucket or helicopter.

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
					g. Each land management unit will develop a contingency plan identifying procedures to be initiated should a chemical spill or contamination occur, and a plan and schedule for principal fire suppression personnel to receive chemical spill training in initiating and completing the contingency plan.
					Location of Fire Camps and Fire Suppression Personnel a. A Fishery Biologist will be involved in the development of the Fire Situation Analysis (FSA) and the Emergency Situation Fire Analysis (ESFA), serving with or as the resource advisor. b. Locations for fire camps, staging areas, and fire base heliports will be located outside RC wherever possible. c. An Aquatic or Fishery Biologist will be readily available to the Incident Commander and will review shift plans to assess the potential effects of the planned actions on aquatic species and their habitat.

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
					Fire Rehabilitation An emergency rehabilitation team will be assigned to all fires over 100 acres. b. An Aquatic or Fishery Biologist will always be assigned to the emergency and non-emergency rehabilitation teams.
					c. Fire lines are to be water barred, seeded (preferably with native species), and otherwise treated to reduce erosion as they are completed. d. Following a fire, an Aquatic or Fishery Biologist will review the suppression and rehabilitation efforts to determine whether requirements and tactics identified in the FSA or EFSA were successfully implemented, and if the revegetation and rehabilitation of the burned area were successful.

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
					e. When large fires affect more than about ten percent of a watershed, a group of scientific experts will be convened to prepare a peer-reviewed watershed analysis of the short- and long-term effects from the wildfire, fire suppression directions and actions, and area revegetation and rehabilitation. The team shall be comprised of scientists from the Federal land management and regulatory agencies. Following the analysis the group may recommend additional appropriate actions for the burned or unburned areas within the watershed.
					Miscellaneous a. Increasing fire intensities within aquatic and riparian habitat during burnout or backfire operations is to be avoided. b. In the case where listed species are potentially affected, FWS or NMFS will be contacted to determine whether emergency consultation should be initiated under the ESA, if any one of these guidelines cannot be met, or if these guidelines are not implemented or not effective in avoiding or minimizing adverse effects to listed salmon and their critical habitat.

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

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Lands					
Varies by forest and BLM land use plan.	**Standard:** Require instream flows and habitat conditions for hydroelectric and other surface water development proposals that maintain or restore riparian resources, favorable channel conditions, and fish passage, reproduction, and growth. Coordinate this process with the appropriate State agencies. During relicensing of hydroelectric projects, provide written and timely license conditions to the Federal Energy Regulatory Commission (FERC) that require fish passage and flows and habitat conditions that maintain/restore riparian resources and channel integrity. Coordinate relicensing projects with the appropriate State agencies.				**Standard:** Do not issue additional water conveyance permits in watersheds that support fish spawning/rearing habitat until instream flows are documented are shown to be adequate to accommodate both the needs of aquatic and riparian-dependent species and the amount of water being conveyed. The needs of fish are defined as those instream flows necessary to optimize all Desired Habitat Standards and essential features of habitat.
	Standard: Locate new hydroelectric ancillary facilities outside RMAs. For existing ancillary facilities inside the RMA that are essential to proper management, provide recommendations to FERC to assure that the facilities would not prevent attainment of the Riparian Management Objectives and that the adverse effects on inland aquatic resources are avoided. Where these objectives cannot be met, provide recommendations to FERC that such ancillary facilities should be relocated. Locate, operate, and maintain hydroelectric facilities that must be located in RMAs to avoid adverse effects on aquatic resources.				**Standard:** Complete peer-reviewed watershed analysis prior to issuing water conveyance permits. The watershed analysis and peer-reviewed must agree that the water conveyance and its effects will not prevent attainment of Riparian Objectives or the maintenance or recovery of aquatic and riparian-dependent species.
	Standard: Issue leases, permits, rights-of-way, and easements to avoid effects that would be inconsistent with or prevent attainment of the Riparian Management Objectives and avoid adverse effects on aquatic resources. Where the authority to do so was retained, adjust existing leases, permits, rights-of-way, and easements to eliminate effects that would retard or prevent attainment of the Riparian Management Objectives or adversely affect aquatic resources. If adjustments are not effective, eliminate the activity. Where the authority to adjust was not retained, negotiate to make changes in existing leases, permits, rights-of-way, and easements to eliminate effects that would prevent attainment of the Riparian Management Objectives or adversely affect aquatic resources. Priority for modifying existing leases, permits, rights-of-way, and easements would be based on the current and potential adverse effects on aquatic resources and the ecological value of the riparian resources affected.				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	Guideline: Use land acquisition, exchange, and conservation easements to meet Riparian Management Objectives and facilitate restoration of fish stocks and other species at risk of extinction.				**Standard:** Where instream flows are inadequate to accommodate both the needs of aquatic and riparian-dependent species and Riparian Objectives and the amount of water being conveyed, do not issue new conveyance permits and revoke those conveyance permits already issued.
General Riparian Area Management					**Water Conveyance Continued**
Varies by forest and BLM land use plan.	**Guideline:** Cooperate with Federal, Tribal, State and local governments to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.				**Standard:** Determine instream flow requirements of ESA listed aquatic and riparian-dependent species, non-listed aquatic and riparian-dependent species and Riparian Objectives and establish flow requirements to meet these needs.
	Guideline: Trees may be felled in RMAs when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.				**Standard:** All water conveyances across federal land lands should be cataloged and compared against state granted water rights. Those without state water rights should have their conveyance permits revoked.
	Standard: Apply herbicides, pesticides, and other toxicants, and other chemicals in a manner that does not retard or prevent attainment of RMOs and avoids adverse effects on aquatic resources.				**Standard:** All water conveyance intakes must meet standards established by these Standards or their conveyance permits should be revoked.

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	Standard: Prohibit storage of fuels and other toxicants within RMAs. Prohibit refueling within RMAs unless there are no other alternatives. Refueling sites within RMAs must be approved by the Forest Service or Bureau of Land Management and have an approved spill containment plan.				**Standard:** All water conveyance permits should require the permittee to use the best methodology to conserve water during conveyance.
	Standard: Locate water drafting sites to avoid adverse effects to aquatic resources and instream flows, and in a manner that does not retard or prevent attainment of RMOs.				
Watershed and Habitat Restoration					
Varies by forest and BLM land use plan.	**Standard:** Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and contributes to attainment of RMOs.				**Standard:** Begin identifying areas that are in obvious need of watershed restoration in those areas as soon as possible. Base priorities on existing and potential risks and effects to listed salmon and their designated critical habitat, as well as the likely effectiveness of the restoration effort.
	Guideline: Cooperate with Federal, State, local, and Tribal agencies, and private landowners to develop watershed based Coordinated Resource Management Plans (CRMPs) or other cooperative agreements to meet RMOs				**Standard:** Develop watershed restoration plans to put instream structures and road obliteration/reconstruction projects into context of all other planned watershed restoration. Plans must address causes of degradation and should use the limiting factor analysis, currently under development by NMFS. The plan also should include: a. Site specific analysis. b. A biological evaluation/ assessment for all "may affect" projects.

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
					c. Certification by both a hydrologist and fishery biologist, with the exception of restoration of fish passage.
Fisheries and Wildlife Restoration					
Varies by forest and BLM land use plan.	**Guideline:** Design and implement fish and wildlife habitat restoration and enhancement actions in a manner that contributes to attainment of the RMOs.				
	Guideline: Design, construct, and operate fish and wildlife interpretive and other user-enhancement facilities in a manner that does not retard or prevent attainment of RMOs or adversely affect aquatic resources. For existing fish and wildlife interpretive and other user-enhancement facilities inside RMAs, assure that RMOs are met and adverse effects on aquatic resources are avoided. Where RMOs cannot be met or adverse effects on aquatic resources avoided, relocate or close such facilities.				
	Guideline: Cooperate with Federal, Tribal, and State wildlife agencies to identify and eliminate wild ungulate impacts that prevent attainment of RMOs or adversely affect aquatic resources.				
	Guideline: Cooperate with Federal, Tribal and State fish management agencies to identify and eliminate adverse effects on aquatic resources associated with fish stocking, fish harvest, habitat manipulation, and poaching.				
Recreation Management					
Varies by forest and BLM land use plan.	**Standard:** Design, construct, and operate recreation facilities, including trails, and dispersed sites in a manner that does not retard or prevent attainment of Riparian Management Objectives and avoids effects on aquatic resources.				
	Standard: Complete watershed analysis prior to construction of new recreation facilities in Riparian Habitat Conservation Areas.		**Standard: Allow construction of minor recreation facilities within RMAs consistent with RMOs which have no predicted measurable effect or cumulative effect.**		

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	Standard: For existing recreation facilities inside RMAs, assure that facilities or use of facilities will not prevent attainment of Riparian Management Objectives or adversely affect native aquatic species. Relocate or close recreation facilities where RMOs cannot be met or adverse effects on aquatic resources cannot be avoided.				
	Standard: Adjust dispersed and developed recreation practices that retard or prevent attainment of RMOs or adversely affect aquatic resources. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective in meeting RMOs and avoiding adverse effects on aquatic resources, eliminate the practice or occupancy.				

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards; S=Substance, P=Process

For levels of activity by alternative and cluster, see tables __-__. For associated guidelines, see list following this O&S table.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
ADAPTIVE MANAGEMENT (P)						
P-O1. Objective[P]: Make appropriate adjustments in management strategies and correct problems.			**P-O1. Objective[P]:** Make appropriate adjustments in management strategies and correct problems as new information, technology, and social desires are identified.			
Not Applicable		**P-S1. Standard[P]:** Use adaptive management principles and processes to adjust management practices to meet ecosystem management goals. Adaptive management shall include all four parts of the process (planning, implementation, monitoring, and evaluation as defined in Appendix ___). Resources should be allocated and priorities established so that all parts of adaptive management are completed over an appropriate time frame.				
P-O2. Objective[P]: To move toward the integrated conditions of the alternative, implement vegetation management activities at a rate that approximates the level described:						
Tables 3-1A and 3-1B	Tables 3-2A and 3-2B	Tables 3-3A and 3-3B	Tables 3-4A and 3-4B	Tables 3-5A and 3-5B	Tables 3-6A and 3-6B	Tables 3-7A and 3-7B
Not Applicable						**P-S2. Standard[P]:** Adjustments to reserve boundaries and corridor locations shown in Figure A7 should be based on basin-wide bio-reserve system needs and consider the following: Select habitats that support populations of scpecies that are rare, narrowly endemic, or significantly declining due to human activity as identified in the Terrestrial STAR. Include centers of endemeism, rarity, or high biodiversity (see Map XX, in Chapter 2) That are located in BLM- or FS- administered lands.

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Not Applicable.						**(P-S2. Continued:)** Use information from GAP analysis and local assessments for additional areas. Include within large reserves (250,000 + acres) at least 10%, but preferrably 20-30% to account for typical disturbance processes, of the range of all major vegetation types. Vegetation type reserves may need to be replicated in multiple locations within the ICBEMP project area if significant differences exist or the risk of large-scale disturbance is high. Reserves should be established for the purpose of conserving biodiversity across the landscape and meet needs of groups of species or plant or animal communities. However, some reserves may be designated for single species purposes (such as for threatened or endangered species).

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For levels of activity by alternative and cluster, see tables __-__. For associated guidelines, see list following this O&S table.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
MONITORING AND EVALUATION (Y)						
Y-O1. Objective[P]: Assess the effects of management strategies by monitoring changes in conditions, and take actions as needed to meet plan objectives.		**Y-O1. Objective[P]:** Assess the effects of management strategies by monitoring changes in conditions, and take actions as needed to meet ecosystem management goals.				
Not Applicable except for table _ displayed for comparison.		**Y-S1. Standard[P]:** Within two years, develop an integrated interagency monitoring and evaluation protocol, coordinated with research, to determine if acceptable progress toward desired conditions is being achieved. The monitoring and evaluation protocol shall include selected key elements to be monitored that can be statistically sampled to provide desired data at a reasonable cost. Monitoring should: (1) Measure the condition and trends of the ICBEMP project area ecosystem. (2) Determine if planned activities have been implemented o BLM- or Forest Service-administered lands, and are meeting the goals and objectives of ecosystem management and remain appropriate; (3) Determine if implementation of activities have achieved desired goals and objectives and whether the standards and guidelines attain goals and objectives of ecosystem management; (4) Ascertain whether cause and effect relationships exist among management activities or resource sand confirm if the predicted results occurred and if assumptions and models used in developing the plan are correct; (5) Be used to make adjustments in management direction.				
Not Applicable	Not Applicable	**Y-S2. Standard[P]:** Regional and State offices shall oversee development and implementation of an annual monitoring program (at various scales from project to river basin level) based on budgets, priorities, and related considerations. The offices shall issue an annual report summarizing monitoring results.				

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Appendix G: Interim Riparian Management Objectives (RMOs)

Alternative 2 & 3

In the development of PACFISH, landscape-scale interim RMOs describing good habitat for anadromous fish were developed, using stream inventory data for pool frequency, large woody debris, bank stability and lower bank angle, and width to depth ratio. Applicable published and non-published scientific literature was used to define favorable water temperatures. All of the described features may not occur in a specific segment of stream within a watershed, but all generally should occur at the watershed scale for stream systems of moderate to large size (3rd to 6th order).This material was reviewed in regard to its applicability to inland native fish. It has been determined that the RMOs described in PACFISH were good indicators of ecosystem health. The analysis that led to development of the RMOs involved watersheds in Oregon, Washington, and Idaho that include inland native fish as well as anadromous fish. With the exception of the temperature objective, which has been modified, the RMOs represented a good starting point to describe the desired condition for fish habitat.

Interim RMOs are considered to be the best watershed scale information available; National Forest managers would be encouraged to establish site-specific RMOs through watershed analysis or site specific analysis. RMOs should be refined to better reflect conditions that are attainable in a specific watershed or stream reach based on local geology, topography, climate, and potential vegetation. Establishment of RMOs would require completion of watershed analysis to provide the ecological basis for the change. However, interim RMOs may be modified by amendment in the absence of watershed analysis where watershed or stream reach specific data support the change. In all cases, the rationale supporting these changes, and the effects of the changes will be documented.

The interim RMOs for stream channel conditions provide the criteria against which attainment or progress toward attainment of the riparian goals is measured as described in the DRFC. Interim RMOs provide the target toward which agency managers aim as they conduct resource management activities across the landscape. It is not expected that the objectives would be met instantaneously, but rather would be achieved over time. However, the intent of interim RMOs are not to establish a ceiling for what constitutes good habitat conditions. Actions that reduce habitat quality, whether existing conditions are better or worse than objective values, are inconsistent with the purpose of this interim direction. Without the benchmark provided by measurable RMOs habitat suffers a continual erosion. As indicated below, some of the objectives would apply to forested ecosystems, some to non-forested ecosystems, and some to all ecosystems regardless of whether or not they are forested. Objectives for six environmental features have been identified, including one key feature and five supporting features. These features are good indicators of ecosystem health, are quantifiable, and are subject to accurate, repeatable measurements.

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<table>
<tr><th>Habitat Feature</th><th colspan="10">Interim Objectives</th></tr>
<tr><td rowspan="3">Pool Frequency (kf[1])
(all systems)</td><td colspan="10">Varies by channel width</td></tr>
<tr><td>Wetted width (feet)</td><td>10</td><td>20</td><td>25</td><td>50</td><td>75</td><td>100</td><td>125</td><td>150</td><td>200</td></tr>
<tr><td>Pools per mile</td><td>96</td><td>56</td><td>47</td><td>26</td><td>23</td><td>18</td><td>14</td><td>12</td><td>9</td></tr>
<tr><td>Water Temperature (sf[2])</td><td colspan="10">No measurable increase in maximum water temperature (7 day moving average of daily maximum temperature measured as the average of the mixinum daily temperature of the warmest consecutive 7 day period). Maximum water temperatures below 59F within adult bulltrout holding habitat and below 48F within bulltrout spawning and rearing habitats.
Maximum water temperatures below 64F within Anadromous fish migration and rearing habitats and below 60F withing Anadromous spawning habitats.</td></tr>
<tr><td>Large Woody Debris (sf)
(forested systems)</td><td colspan="10">Coastal California, Oregon, and Washington:
> 80 pieces per mile; >24 inch diameter; >50 foot length.
East of cascade Crest in Oregon, Washington, Idaho:
> 20 pieces per mile; > 12 inch diameter; > 35 foot length.</td></tr>
<tr><td>Bank Stability (sf)
(non-forested systems)</td><td colspan="10">> 80 percent stable.</td></tr>
<tr><td>Lower Bank Angle (sf)
(non-forested systems)</td><td colspan="10">> 75 percent of banks with <90 degree angle (i.e., undercut).</td></tr>
<tr><td>Width/Depth Ratio (sf)
(all systems)</td><td colspan="10">< 10, mean wetted width divided by mean depth</td></tr>
</table>

[1]Key features
[2]Supporting feature

Alternative 4 and 6

Intent of RMOs

Interim RMOs for stream channel conditions provide the criteria against which attainment or progress toward attainment of the riparian goals is measured. Interim RMOs provide the target toward which agency managers aim as they conduct resource management activities across the landscape in the absence of Ecosystem Analysis. It is not expected that the objectives would be met instantaneously, but rather would be achieved over time. These variables provide a synoptic description and characterization of watershed, riparian, and stream channel processes and existing conditions that can be used to guide management activity design, implementation, and monitoring. RMOs are used as a tool, in combination with watershed management objectives, to help assess attainment of watershed, riparian, and aquatic goals and objectives.

Interim RMOs (Table 1) describe watershed-scale habitat conditions for specific geoclimatic areas within the interior Columbia River Basin. The attributes are divided into three basic categories: Instream variables, water temperature, and riparian vegetation. The following statements provide the intent for use of the interim RMOs and their purpose in a comprehensive conservation program.

1. RMOs are a tool to help evaluate progress towards attainment of watershed, aquatic and riparian goals described within the DRFC.

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2. RMOs **should** be developed/analyzed for application at finer scales through evaluation of reference conditions in similar landforms, valley settings, and stream types. The interim values in Tables 1, 2, and 3 provide a starting point if local analysis is not completed but it is recommended that Field Units conduct their own analysis due to the variable conditions in the interior Columbia River Basin. Field units should consider using similar techniques described by Overton et al. (1995) to define appropriate RMOs.

3. Analysis of stream inventory and riparian data together with Ecosystem Analysis is useful to identify watershed processes and stream reaches that may not be functioning properly.

4. Streams and riparian conditions which currently exceed interim RMOs should be managed consistent with the state water quality anti-degradation policy.

5. Interim RMOs are not to be viewed as independent from other components of the comprehensive Aquatic Conservation Strategy, rather are part of an aquatic conservation progam. Interim RMOs are not sensitive to immediate effects, rather exhibit response to cumulative effects and factors influencing channel history over time.

6. Interim RMOs do not replace State and Federal water quality standards promulgated under federal Clean Water Act or state laws, but should complement these standards in providing measurable habitat attributes.

Procedure for Interim RMO Application

Stream inventory data is primarily viewed as an information source useful in developing an understanding of watershed/stream systems, which then serves as a foundation to make policy and management decisions. This information can then be used to establish management objectives to conserve or restore watershed and aquatic functions. Interim RMOs apply to all perennial streams that support aquatic life for a portion of the year, for example spawning streams that have discontinuous low flow late in the year would still be subject to these attributes. Individual parameters should not be used to evaluate aquatic and riparian condition, rather they should be used in combination to provide a synopsis of condition. Placing emphasis on individual variable interpretations may lead to erroneous conclusions related to watershed, riparian, and aquatic condition.

Interim RMO application or development can follow these steps:

1. Field Units should establish values or ranges of important riparian and in-stream variables expected for natural conditions, stratified by stream types and biophysical environments.

2. The values listed in Tables 1 and 2 are a starting point but local analysis is preferred due to the variable nature of streams within the interior Columbia River Basin.

3. If current conditions are largely different than locally established values or interim values, further analysis should be conducted to determine the reasons for these differences in terms of watershed, riparian, and channel processes. Watershed-scale interim RMOs may be outside the range of natural conditions for a specific area. A fine-scale evaluation of reference condition should be used to identify causal mechanisms. Stream conditions can vary from disturbances and channel evolution histories that influenced channel form and conditions.

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4. Using information from step 3, establish management objectives that relate to conserving or restoring watershed, riparian, and channel processes.
5. Recommend management activities to meet the intent of objectives in step 4 to achieve desired outcomes based on the understanding of watershed, riparian, and channel processes.

6. Conduct implementation and effectiveness monitoring to determine if management activities have the intended results and "feedback" information for future management objectives and actions.

Instream Variables.

The values in Table 2 are points of reference from which current conditions can be evaluated if local analysis of reference stream inventory information is not performed. These values were developed from analysis of stream inventory measurements collected from over 2000 streams (6382 reaches) within the project area and synthesized as part of the ICBEMP Assessment (Star—Chapter 3). The ranges in Table 2 display the 50th to 75th percentiles of stream inventory data from watersheds in natural to near natural condition (Management Area Categories 1 and 2; Wilderness and Research Natural Areas). Data is not continuous over the entire assessment area which is reflected by low sample sizes or areas of no data (ERU 10, 11, and 12). Consider using CRB wide RMO values when sample size is low or data is not displayed for a strata. Caution should be used when making interpretations from CRB values or strata with low sample size. It also should be noted that most stream inventory data was collected from forested stream systems and may not be applicable to rangeland stream systems. It is important to consider that if the interim values are not appropriate for the local area, a similar analysis process can be used with local data to determine the appropriate numbers for the scale of concern (e.g. 4th or 6th field HUCs or stream reach).

To calculate large pools, pools, large wood, and single wood per mile from Table 2 use the following conversion:

number per mile=(table frequency value)x5280/average riffle width in feet

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Table 1. Summary of Interim RMOs

Category	Interim Criteria
I. Instream Variables Large Pools per Mile Pools per Mile Pool Width/Depth Large Wood per Mile (forested systems) Single Wood per Mile (forested systems)	Stratified by ERU and stream slope class in Table 2.
Bank Stability (non-forested systems)	>80 percent bank stability in ERUs 1-12 >90 percent bank stability in ERU 13 (Overton et al. 1995)
Fine sediment	Surface fine sediment levels should be developed by local Field Units for their area. In ERU 13, mean surface fines (<6.0 mm) as measured in pool tails and low gradient riffles are described as follows (Overton et al. 1995):

Channel Type	Plutonic Geologic Type	Volcanic Geologic Type	Metamorphic Geologic Type
A	26	25	14
B	23	27	16
C	37	17	no data

Category	Interim Criteria
II. Temperature	No measurable increase in maximum water temperature (7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period) as required by state water quality standards.
III. Riparian Vegetation	Forest and range riparian areas: Mature forest and late ecological status range riparian conditions adapted to non-lethal, lethal, or mixed fire regimes and other disturbances characteristic of the site. This should be measured by the percent similarity of riparian vegetation to the mature forest and late ecological status range community/composition. The percent similarity should be greater than 60 percent (USDA 1992).

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Table 2. Range of instream values for the ICBEMP area displayed by the 50th and 75th percentile for natural and near natural stream data distribution. All values except pool width/mean maximum depth are normalized by stream width. Ranges in the heading represent interior Columbia River Basin conditions and are not stratified by ERU or slope class. Numbers within parentheses are sample sizes. Blank cells indicate no data. A brief description of each variable follows this table.

ERU	Slope Class	Large Pools Per Mile		Pools Per Mile		Pool Width/ Mean Max Depth		Large Wood Per Mile		Single Wood Per Mile	
		50	75	50	75	50	75	50	75	50	75
		0.009-0.036 (870)		0.040-0.077 (870)		5.6 - 4.2 (831)		0.048-0.158 (450)		0.179-0.354 (259)	
1	All	0.020 (143)	0.049	0.048 (143)	0.082	5.4 (140)	4.3	0.092 (135)	0.209	NA	NA
	<2%	0.032 (8)	0.050	0.039 (8)	0.050	7.0 (8)	6.3	0.146 (8)	0.429	NA	NA
	2-4%	0.039 (35)	0.062	0.066 (35)	0.096	6.7 (36)	5.3	0.158 (33)	0.550	NA	NA
	>4%	0.018 (95)	0.042	0.039 (95)	0.076	4.8 (92)	4.1	0.058 (89)	0.176	NA	NA
2	All	0.006 (43)	0.025	0.044 (43)	0.069	6.2 (40)	5.2	0.049 (40)	0.148	NA	NA
	<2%	0.004 (17)	0.032	0.045 (17)	0.103	6.2 (15)	5.2	0.049 (15)	0.148	NA	NA
	2-4%	0.014 (6)	0.061	0.061 (6)	0.168	7.5 (6)	5.9	0.134 (6)	0.427	NA	NA
	>4%	0.006 (19)	0.018	0.031 (19)	0.060	5.5 (18)	4.9	0.049 (18)	0.145	NA	NA
3	All	0.001 (14)	0.009	0.009 (14)	0.023	5.1 (13)	4.2	0.046 (13)	0.084	NA	NA
	<2%	(2)		(2)		8.2 (1)		0.091 (1)		NA	NA
	2-4%	0.014 (5)	0.015	0.024 (5)	0.026	6.2 (5)	4.6	0.073 (5)	0.085	NA	NA
	>4%	0.000 (7)	0.002	0.008 (7)	0.014	4.4 (7)	4.0	0.037 (7)	0.075	NA	NA

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Table 2 Continued.

ERU	Slope Class	Large Pools Per Mile		Pools Per Mile		Pool Width/ Mean Max Depth		Large Wood Per Mile		Single Wood Per Mile	
		50	75	50	75	50	75	50	75	50	75
		0.009-0.036 (870)		0.040-0.077 (870)		5.6 - 4.2 (831)		0.048-0.158 (450)		0.179-0.354 (259)	
4	All	0.000 (59)	0.003	0.027 (59)	0.049	2.4 (45)	2.1	0.019 (44)	0.062	NA	NA
	<2%	0.000 (17)	0.005	0.027 (17)	0.053	2.4 (14)	2.1	0.006 (12)	0.025	NA	NA
	2-4%	0.001 (22)	0.004	0.029 (22)	0.044	2.4 (17)	2.2	0.020 (17)	0.085	NA	NA
	>4%	0.000 (19)	0.000	0.030 (19)	0.051	2.4 (13)	1.9	0.020 (14)	0.067	NA	NA
5	All	0.017 (6)	0.048	0.053 (6)	0.084	4.4 (6)	4.2	0.025 (4)		NA	NA
	<2%	0.035 (1)		0.123 (1)		7.6 (1)				NA	NA
	2-4%	0.043 (2)		0.063 (2)		7.6 (2)		0.032 (2)		NA	NA
	>4%	0.000 (3)	0.000	0.032 (3)		4.4 (3)		0.018 (2)		NA	NA
6	All	0.003 (174)	0.016	0.027 (174)	0.052	4.4 (171)	3.4	0.040 (162)	0.117	NA	NA
	<2%	0.021 (18)	0.042	0.026 (18)	0.048	4.4 (17)	3.8	0.008 (14)	0.068	NA	NA
	2-4%	0.015 (27)	0.048	0.027 (27)	0.061	6.0 (27)	3.5	0.086 (24)	0.133	NA	NA
	>4%	0.001 (126)	0.009	0.027 (126)	0.049	4.2 (124)	3.2	0.038 (121)	0.156	NA	NA
7	All	0.009 (27)	0.018	0.014 (27)	0.028	5.4 (25)	4.3	0.009 (26)	0.040	NA	NA
	<2%	0.017 (6)	0.033	0.017 (6)	0.034	5.7 (6)	5.2	0.009 (6)	0.013	NA	NA
	2-4%	0.013 (9)	0.023	0.018 (9)	0.032	5.7 (9)	4.9	0.009 (9)	0.044	NA	NA
	>4%	0.000 (11)	0.001	0.011 (11)	0.030	4.3 (10)	3.7	0.006 (10)	0.151	NA	NA

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Table 2 Continued.

ERU	Slope Class	Large Pools Per Mile		Pools Per Mile		Pool Width/ Mean Max Depth		Large Wood Per Mile		Single Wood Per Mile	
		50	75	50	75	50	75	50	75	50	75
		0.009-0.036 (870)		0.040-0.077 (870)		5.6 - 4.2 (831)		0.048-0.158 (450)		0.179-0.354 (259)	
8	All	0.008 (72)	0.027	0.033 (45)	0.051	5.2 (45)	4.2	0.344 (26)	0.652	0.401 (10)	0.498
	<2%	0.016 (11)	0.034	0.032 (11)	0.094	5.3 (11)	4.8	0.149 (1)		0.271 (5)	0.446
	2-4%	0.007 (16)	0.028	0.032 (16)	0.043	5.4 (16)	3.7	0.244 (10)	0.616	0.460 (4)	
	>4%	0.007 (18)	0.032	0.035 (18)	0.060	4.7 (18)	4.1	0.567 (15)	0.718	0.834 (1)	
9	All	(1)		0.162 (1)		6.2 (1)		NA	NA	2.274 (1)	
	<2%	(0)		(0)		(0)		NA	NA	(0)	
	2-4%	(1)		0.162 (1)		6.2 (1)		NA	NA	2.274 (1)	
	>4%	(0)		(0)		(0)		NA	NA	(0)	
13	All	0.018 (358)	0.050	0.058 (358)	0.103	6.5 (345)	5.1	NA	NA	0.170 (248)	0.335
	<2%	0.034 (109)	0.062	0.065 (109)	0.111	7.5 (111)	5.6	NA	NA	0.179 (81)	0.375
	2-4%	0.021 (149)	0.050	0.070 (149)	0.116	6.9 (146)	5.6	NA	NA	0.169 (116)	0.306
	>4%	0.002 (100)	0.027	0.034 (100)	0.070	5.4 (88)	4.5	NA	NA	0.150 (51)	0.348

Large Pool Frequency: The number of pool channel units with a maximum depth greater than 0.8 m (2.6 feet) and surface area greater than 20 m^2 (215 ft^2) per the reach mean riffle width. This is calculated by: (number of large pools)x[(average riffle width)/(reach length)]. Because of the problems with pool frequency measurements for high gradient streams values were not assigned for the slope class >4%.

Pool Frequency: The number of pool channel units per reach mean riffle width. This is calculated by: (number of pools)x[(average riffle width)/(reach length)]. Because of the problems with pool frequency measurements for high gradient streams values were not assigned for the slope class >4%.

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Large Wood Frequency: The number of pieces of wood per reach mean riffle width, surveyed with the USFS Region 6 stream inventory protocol. Tallied wood includes all pieces with diameters greater than 20 inches and lengths greater than 35 ft (the "large" category of the Region 6 protocol). This is calculated by: (number of pieces of large wood in the reach)x[(average riffle width)/(reach length)]. This value should only be used as a reference condition in forested landscapes in eastern Washington and eastern Oregon.

Single Wood Frequency: The number of single pieces of wood per reach mean riffle width, surveyed with the USFS Region1/4 stream inventory protocol. Tallied wood includes pieces with diameters greater than 10 cm (4 inches) and lengths that exceed 3.0 m (9.8 ft) or two thirds the channel width. This is calculated by: (number of pieces of wood in the reach)x[(average riffle width)/(reach length)]. This value should only be used as a reference condition in forested landscapes in Idaho and western Montana.

Alternative 5

Timber emphasis areas within Forested environments

RMOs are locally developed based on key channel and habitat characteristics in the watershed of concern. These measures are then compared with those from streams of highly similar channel and watershed geomorphic character, which are judged to fully support the waters' beneficial uses, in order to produce "reference conditions. Determination of "fully support" must include documentation of assumptions on which judgements are based, allowing for revision over time as new information becomes available. Benchmarks based on the reference conditions can then be established for instream characteristics and remeasured over time to evaluate change. This system allows for the effectiveness of management practices to be monitored in relation to the benchmarks in order to provide a meaningful basis for adaptive management.

A benchmark-based system for developing RMOs can be summarized as follows:

a. Existing riparian conditions are measured and compared with reference conditions, where possible, to establish benchmarks.

b. Prescriptions (site-specific standards and guides) are developed to ensure high levels of function even when the relationship of existing conditions to natural or reference conditions remains uncertain.

c. Monitoring is conducted in an adaptive management framework in order to answer four key questions: 1) was the situation diagnosis correct? 2) was the prescription correct? 3) was the prescription implemented? 4) was the prescription effective?

RMOs are not defined on the basis of instream standards because meaningful instream standards cannot be developed from existing databases at this time, except in some localized situations. Instream characteristics are a product of complex vegetation, channel, and landscape geohydrologic and stochastic processes and interactions. The instream products of these processes and interactions are, by their very nature, difficult to predict for any given place and point in time. However, if riparian zone timber and other attributes are managed on a functional basis, stream inputs will be maintained to produce desired instream attributes and functions.

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In summary, RMOs relevant to each stream input process of concern are integrated into the analysis and subsequent management decision-making system.

Livestock emphasis areas within rangeland environments

RMOs are to be based on the definition of "Proper Functioning Condition" as follows:

Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to:

a) dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality;
b) filter sediment, capture bedload, and aid floodplain development;
c) improve flood-water retention and ground-water recharge;
d) develop root masses that stabilize stream banks against cutting action;
e) develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses;
f) and support greater biodiversity.

Other Emphasis Areas

Interim RMOs as described for Alternative 4 and 6 will apply to other emphasis areas.

Alternative 7

RMOs provide measurable criteria against which attainment, or progress toward attainment, of the aquatic and riparian goals are measured as described in the DRFC. These RMOs do not address all the complex elements of the aquatic and riparian goals. RMOs provide a measure of whether land management practices are providing watershed and habitat characteristics which will support aquatic species. If conditions at the watershed scale or site-specific scale are below these criteria then it must be determined why the watershed is not meeting objectives. Where land management activities are the causal agent for not meeting the riparian management objectives then a plan to remedy the problem needs to be developed.

These Riparian Management Objectives were developed based on those from PACFISH, the NMFS PACFISH Biological Opinion (BiOp) and the NMFS LRMP BiOp. These in turn were based on the biological habitat requirements of fish and aquatic resources (Rhodes et al. 1994) or based on conditions in undeveloped watersheds as a benchmark (Peterson et al. 1993). For salmonids, RMOs should address habitat components for life history stages affected by land management activities. Habitat requirements for salmonids have been summarized in Bjornn and Reiser, 1991 and Murphy, 1995.

The method of adjusting the RMOs to particular watersheds is through Watershed Analysis; if interagency peer reviewed watershed analysis shows that habitat recovery is enhanced and not retarded by adjustment, or is that these RMOs are not attainable within the watershed, then these RMOs should be adjusted according to the findings of the watershed analysis. Below are RMOs for sediment delivery, fine sediment, cobble embeddedness, pools, large woody debris, streambank stability, width/depth ratio, and temperature based on those proposed for PACFISH (USDA and USDI 1994) and Rhodes et al. (1994):

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1. Sediment Delivery Standard: Reduce delivery of sediment to streams to no more than 20% over natural from all anthropogenic sources in watersheds containing current or historic spawning or rearing habitat, unless it can be shown through watershed analysis based on peer reviewed science that stream habitat conditions can improve and substrate and pool standards can be met with a different sediment standard.

2. Fine Sediment Standard: Limit stream surface fine sediment (<6.4 mm in diameter) averages to <20% in spawning habitat.

3. Cobble Embeddedness Standard: Limit stream cobble embeddedness to <30% in rearing habitat.

4. Bank Stability Standard: Ninety percent of all stream banks should be in a stable condition.

5. Water Temperature Standard: Reduce or maintain summertime stream temperatures; reduce temperatures if over 60° F in salmon spawning or rearing habitat. In areas where salmon do not occur, the optimal range required by the most sensitive native species should dictate the desired habitat temperature parameter. For instance, where bull trout rear, temperatures should not exceed 46 degrees. During bull trout spawning season, temperatures should not exceed 41 degrees, and adult bull trout habitat should not exceed 59 degrees.

Interim Riparian Management Area (RMA) Delineation

Alternative 4 and 6

<u>Intent of RMAs</u>

Riparian management areas (RMAs) are areas where maintenance, protection, and restoration of aquatic processes and functions are emphasized and goals and objectives for aquatic and riparian habitats are met. Riparian systems are water influence areas that include streams and other aquatic ecosystems. Conservation needs for aquatic and riparian systems can be summarized in four principles (Sedell, personal communication).

1) A stream needs nutrient inputs and energy to sustain its biological functions.
2) Riparian dependent plants and animals rely on the forest adjacent to streams.
3) Small streams are more affected by hillslope processes than larger streams.
4) The likelihood of disturbance resulting in in-stream effects increases as adjacent slopes become steeper.

RMAs can be defined in terms of zones or gradients of influence, with an inner zone, where many primary processes and functions occur, and an outer zone, where processes and functions occur but at different, less important (secondary) levels to the stream channel. The outer riparian zone also functions as a transition and buffer between upslope uses and disturbances and the aquatic environment.

Ecological functions, processes, and disturbance mechanisms are guides for use and protection priorities in riparian areas. Boundaries between the riparian area and the upslopes may need expansion to address each of the larger scale disturbance effects that may negatively or positively impact the unique habitats or sensitive species in riparian environments. To ignore the existence

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of these disturbance effects and attempt to maintain a static reserve system may jeopordize the unique habitats and also the sustainability of associated landscapes (Everett, 1995). The actual size of riparian areas depends on the local characteristics that define them; it is important to understand that the dimensions of entire riparian areas are not always proportional to the size of aquatic systems.

To apply these concepts in RMA delineation, RMAs are divided into two zones as noted: an inner zone (zone 1) and an outer zone (zone 2). The zone concept is an initial attempt to integrate the hierarchical landscape approach with the individual conservation needs of unique riparian habitats. Zoning delineates major influence areas, establishing a basis for different levels of disturbance and vegetation management in each zone. This scheme sets the foundation for cumulative effects determination that is spatially-sensitive in considering watershed disturbing effects.

The dominant processes, functions, disturbance mechanisms for each zone are displayed as variables in Tables 1 and 2, for perennial and intermittent streams.[1]

Intent of Zone 1 and Zone 2

Zone 1 is the inner riparian area, the community and energy influence area. It is most important for protection and maintenance of instream conditions. It also serves to transition processes, functions, and disturbances from streams to floodplains and adjacent riparian areas. Zone 1 is the area most sensitive to management activities and extends from streams the distances that approximate the height of the tallest site potential tree (Sedell, personal commnication).

Zone 2 is the outer riparian area, and provides additional riparian area process and functions (for example, microclimate) and also is a buffer area capable of absorbing disturbances from the uplands. It is commonly variable in width and is the interface and transition between the inner riparian area and the uplands.

Table 1 displays the dominant processes, functions, and disturbance mechanisms for the two riparian zones in perennial stream environments. Table 2 displays the dominant processes, functions and disturbance mechanisms for the two riparian zones for intermittent stream environments. Neither list is inclusive.

Perennial and intermittent streams variables were separated into two tables because the processes, functions and disturbance mechanisms for these systems are different (principle 3 and 4). Intermittent streams often have steeper adjacent sideslopes and can be more prone to slope instability.

[1]Not all variables apply to rangeland systems

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Table 1. Perennial Streams. Dominant Processes, Functions, and Disturbance Mechanisms.

Variables	Zone 1	Zone 2
Shade for stream temperature	P*	
Shade for riparian species	P	S
Large wood delivery to streams		S
Large wood delivery to riparian areas	P	P
Leaf and other organic matter inputs	P	S
Riparian microclimate	P	S
Buffer for water quality	P	P
Nutrient and energy to streams	P	S
Habitat: aquatic species	P	
Habitat: riparian dependent species	P	S
Habitat/migration for terrestrial species	P	
Root strength	P	S
Soil moisture & temperature	P	S
Sediment trapping	P	S
Flooding **	P	S
Fire**	S	S
Insects and Disease**	S	S

* P=primary emphasis S=secondary emphasis
**Primary natural disturbance mechanisms

Table 2. Intermittent Streams. Dominant processes, functions, and disturbance mechanisms.

Variable	Zone1	Zone 2
Shade for riparian species	P	P
Large wood delivery to streams	P	P
Large wood delivery to riparian areas	P	P
Leaf and other organic matter inputs	P	S
Riparian microclimate	P	P
Buffer for water quality	P	P
Nutrient and energy to streams	P	S
Habitat: aquatic species	P	
Habitat: riparian dependent species	P	P
Root strength	P	S
Soil moisture & temperature	P	P
Sediment trapping	P	P
Flooding *	P	S
Debris flows	P	P
Fire*	S	P
Insects and Disease*	S	P

* P=primary influence S=secondary influence
**Primary natural disturbance mechanisms

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RMA Interim Delineation Process

The following process is used for interim delineation of RMA widths, to highlight riparian areas, until more locally specific information from watershed scale and other appropriate analysis is in place.

RMA delineation is based primarily on two indicators: site potential tree heights or extent of flood-prone width. For forested environments, site potential tree heights are the primary determinant (concepts taken from FEMAT and PACFISH). For rangeland environments floodprone width by channel type is the primary determinant. Extent of riparian vegetation, for either forested or range-land systems, can be used as well, if data is available. The determinant for zone 1 would be the extent of the hydro and meso riparian potential natural vegetation, and the determinant for zone 2 would be the extent of the xeroriparian potential natural vegetation.

I. Forested Environments

The process for interim delineation for riparian areas divides RMAs into two zones, using the principle of a site potential tree height for both zones as a starting point and adjustment for additional width, based on adjacent sideslope steepness, to buffer the aquatic environment from disturbances. Floodprone width can also be used. See section II, Rangeland Environments, for procedure.

A. Perennial Streams

Zone 11 site potential tree height, or the extent of the floodprone area; whichever is greater.
Zone 21 site potential tree height plus adjustment for disturbance buffer using Figure 1.

B. Intermittent Streams

Zone 1: 1/2site potential tree height, or extent of the floodplain area, whichever is greater.
Zone 2: 1/2 site potential tree height plus adjustment for disturbance buffer using Figure 2.

C. All streams

Overlay zone 1 and zone 2 widths with unstable and landslide prone areas for full delineation of area requiring emphasis for aquatic and riparian environments.

D. Total RMA for a stream system

The sum of the width determined from steps A through C is the total RMA for the stream network of concern. For example, a perennial sream with a site potential tree height of 150 feet and 40 percent adjacent sideslope has the following RMA width.

Example:
RMA = 1 SPTH (z1) + 1 SPTH (z2) + 0 feet from figure 1 = 300 feet

Additional area requiring special consideration for protection and management is added from landslide prone analysis if it overlaps and extends beyond the RMA. Landslide prone determination shall be based on the procedure outlined in Montgomery (?).

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Site Potential Tree Heights Definitions and SlopeTables

The definition of "site potential tree" for purposes of defining a default is:

> "The average maximum height of the tallest dominant trees (200 years or more) for a given site class" (FEMAT, pV-34).

Data from the Science Assessment for the three forested potential vegetation groups (PVGs) in the Interior Columbia Basin shows the following average maximum heights.

PVG	Site Class	Dominant Species	Ave. Max. Height
Dry Forest	?	Ponderosa Pine/W. Larch ?	— feet
Moist Forest	?	Douglas Fir/Grand Fir ?	— feet
Cold Forest	?	SubAlpine Fir/E. Spruce ?	— feet

The height of the dominant trees for any given site is a function of site quality based on elevation, temperature, soil properties, and other determinants, and therefore is subject to wide variation across any given landscape. The numbers in the above table are coarse averages estimated using data from subsample and classifications from an average site class (?). If local data from site potential curves or other sources is available, they can be used instead of the above PVG number, as long as the above definition is applied.

Adjustments for needed sediment buffering will be determined using Figure 1 and 2. The adjustment is based on the steepness of side slopes adjacent to the stream channel (principle number 4), using travel distances of surface erosion as the basis for disturbance buffers. It is well established that surface erosion depends strongly on hillslope gradient and can be expressed as a power function (Selby, 1982). This is consistent with the observations of Megahan and Ketcheson (in press) that sediment travel distances from cross drains on Idaho Batholith roads is proportional to gradient. The curves in figures 1 and 2 are set for sediment travel distances at a 5% exceedence probability as measured by Ketcheson and Megahan (in press) for Batholith soils. Since these soils represent some of the highest surface erosion hazard in the Interior Columbia Basin, travel distances for erosion from other parts of the Basin are expected to be inclusive in the RMA widths as determined from figures 1 and 2.

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Figure 1.

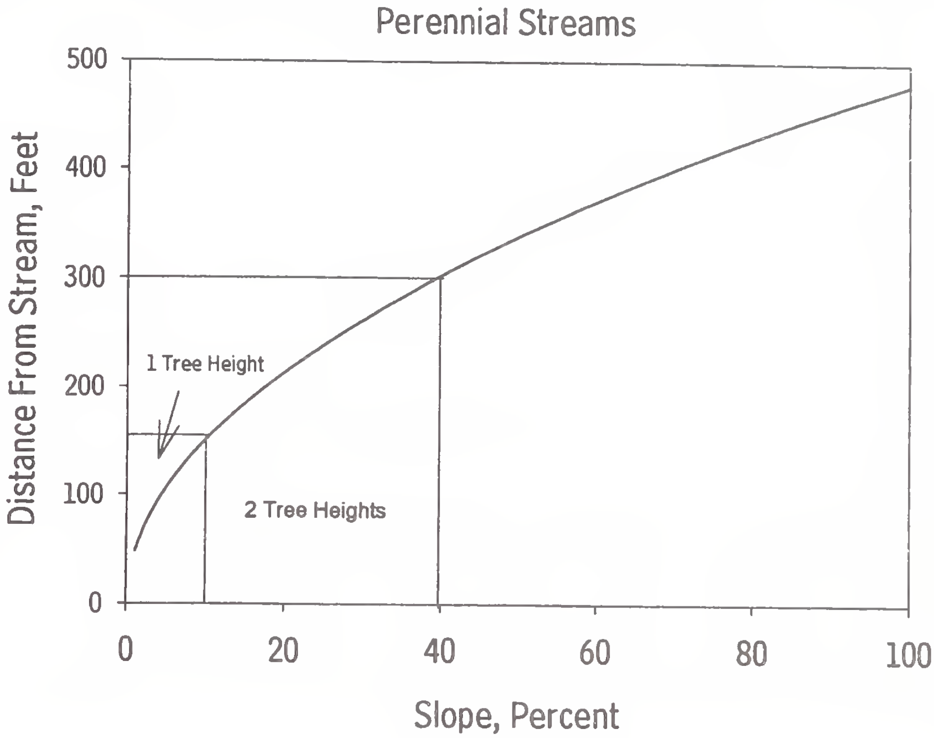
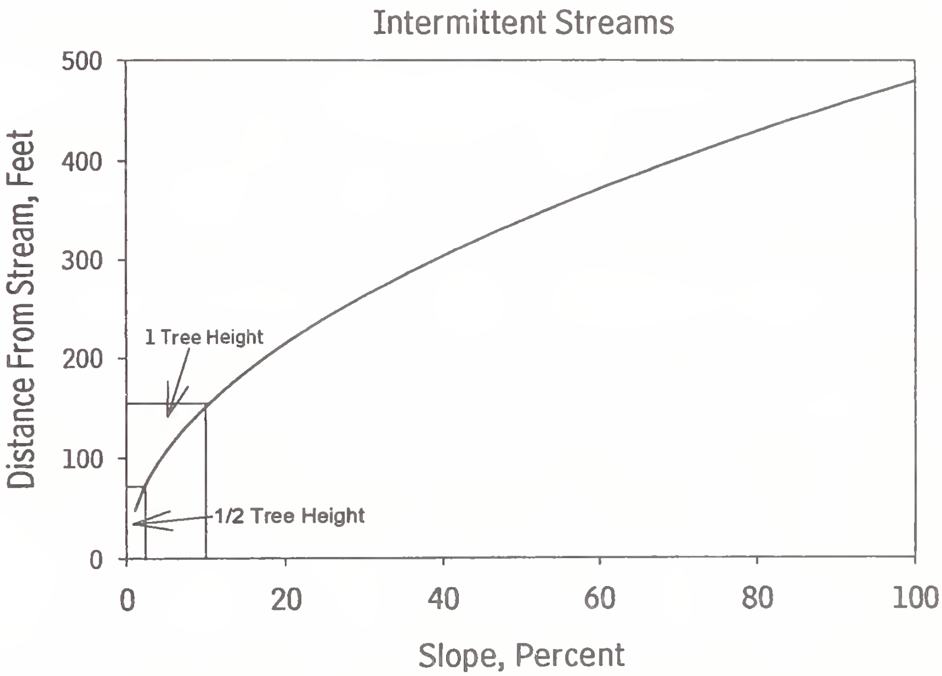


Figure 2.



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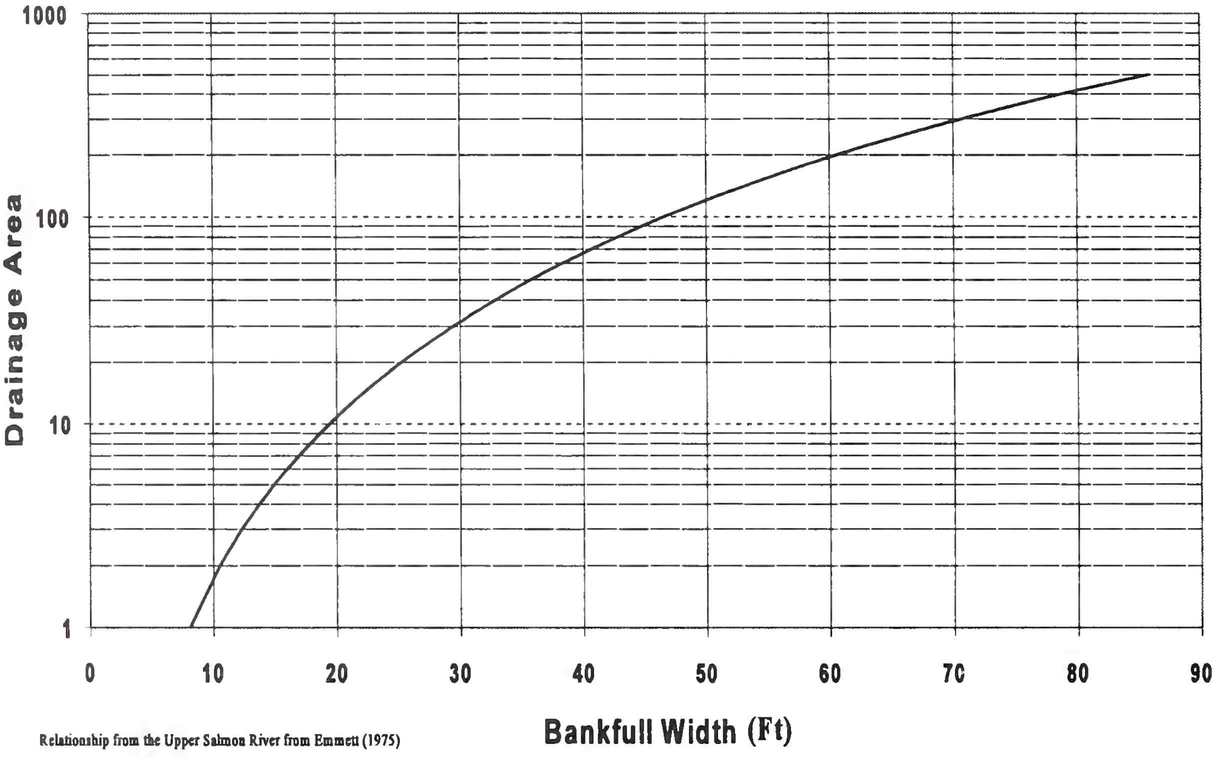
II. Rangeland Streams

Interim riparian management area delineation for rangeland perennial or intermittent streams shall be based on the flood-prone width or the extent of riparian vegetation whichever is greater. Riparian vegetation can be delineated by aerial photographs or field inspection. Floodplain area is essentially equivalent to flood-prone width defined by Rosgen (1994). The following steps can be used to determine the flood-prone area. It is suggested that Field Units develop relationships between bankfull width and drainage area or utilize existing relationships for their area.

1. Determine bankfull width from Figure A for the drainage area above the point on the stream.
2. Determine the channel type (A, B, C, F, or G; Rosgen 1994) from aerial photographs.
3. Select the entrenchment ratio (Rosgen 1994) for the particular channel type.
   - A, F, and G channel types = 1.4
   - B channel types = 2.2
   - C and E channel types = 5.3
4. Calculate the flood-prone area by multiplying the bankfull width and entrenchment ratio.

Figure A.

Relationship Between Bankfull Width and Drainage Area



Relationship from the Upper Salmon River from Emmett (1975)

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Appendix H: Noxious Weed Control Guidelines Pertinent to an IWM Strategy (from USDI-Bureau of Land Management, 1994)

Use the following cultural, physical, biological, and chemical control guidelines to implement and determine the best method(s) for an integrated approach to noxious weed management.

Cultural

<u>Prevention</u>

1. Develop available preventive measures, such as quarantine and closure, to reduce the spread of the infestation.
2. Determine whether policy and laws allow for the use of all preventive measures, including local quarantine and closure.
3. If past management activities have allowed the introduction and spread of noxious weeds, determine how to change management for selecting a treatment method.

<u>Livestock Manipulation</u>

1. Determine whether changes in livestock grazing will affect the target weeds. a. Reduced grazing may allow for increased competition from beneficial vegetation or just allow for more seeds to be disseminated. b. Increased grazing may reduce beneficial vegetation or may be used to reduce seed source.
2. Determine whether changes in movement or type of livestock is necessary to reduce or contain the infestation due to movement of seeds on or in the animals.
3. Determine whether containing livestock in a weed free area prior to introduction to the area would prevent new infestations.

<u>Wildlife Manipulation</u>

1. Determine whether wildlife or wildlife feeding programs can be managed to reduce weed infestations.
2. Determine feasibility of changes in wildlife movement that would reduce or contain the infestation due to movement of seeds on or in the animals.

<u>Soil Disturbance Activities</u>

1. Revegetate all bare soil following disturbance.
2. Select plant species that will reduce the spread of noxious weeds.
3. Defer soil disturbance if possible until weeds are controlled or under management.

<u>Rock Sources</u>

1. Develop rock source management plans.
2. Keep utilization of rock source confined to existing contaminated roads.
3. Keep new or "clean" rock stockpiles separate from contaminated stockpiles.
4. Obtain rock from uncontaminated sources.

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Public Use

1. Determine most feasible land use to reduce and prevent infestations.
2. Determine whether specific public awareness programs could reduce the infestation or control the spread of weeds.
3. Determine whether exclusion is a possibility and how it would affect the weed infestation.

Physical

Manual Control

1. Determine whether hoeing or "grubbing" will reduce (or increase) the infestation.
2. Determine whether hand pulling the weeds reduces the seed source.

Mechanical Control

1. Evaluate terrain to allow for mowing and determine whether it is an acceptable option for control of the spread of seeds.
2. Evaluate cultivation and other conventional farming practices options that could be utilized cost effectively.

Control by Burning

1. Determine whether policy and laws allow controlled burning and address regulations regarding smoke management.
2. Determine whether the terrain and vegetation cover allow for a controlled burn program.
3. Evaluate a controlled burn program to reduce the infestation.
4. Determine long-term effect of burning on nontarget species.

Biological

Natural Competition

1. Determine whether there are naturally occurring agents within the ecosystem which can reduce the infestation.
2. Determine which elements affect naturally occurring control agents. a. Determine whether these elements can be modified to reduce the negative effect on these agents. b. Determine whether these elements can be enhanced to increase the effectiveness of these agents on the weed infestation.

Introduced Competition

1. Determine whether biological control agents can be introduced into the ecosystem to reduce the amount of infestation.
2. Determine which introduced biological agents provide an acceptable control method for this infestation.
3. Evaluate if the biological control agent has been tested for adverse effects against all nontarget species within the treatment area.
4. Determine whether the introduced biological agent can survive in the environment of the treatment area.

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5. Determine whether policy and laws allow for the introduction of biological control agents.
6. Determine whether policy and laws allow for introduction and grazing of livestock as a biological control measure.

Chemical

Fertilization

1. Determine whether chemical fertilization would reduce the amount of weeds by increasing competition of beneficial plant species.
2. Determine whether increased nitrogen (or other nutrients) would reduce weeds due to direct effect (for example, Curlycup gumweed).

Pesticides

1. Evaluate the acceptability of herbicides (or other pesticides) to control the infestation.
2. Determine whether pesticides are labeled for use on the target weed and use on the infested site (consider nontarget plants, soil type, groundwater location, topography, climate, state labeling). Determine the most effective application techniques.
3. Determine the most effective and cost-effective types of conventional application equipment.
4. Determine whether properly trained personnel are available to apply the pesticides.

Literature Cited

U.S. Department of the Interior, Bureau of Land Management, 1994. Noxious weed strategy for Oregon/Washington. Oregon State Office, Portland, Oregon. BLM/OR/WA/PT-94/36+4220.9.

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Table 2 Last Revised 2-17-96

Forest Cluster
Activity Level Assumptions

	Low	Moderate	High
Harvest (commercial) **Alts. 1,2,7 >** (% of all forested area treated/decade)	0-4	4-8	8-10
Alts. 3-6 >	0-5	5-9	9-11
Thin (pre-commercial) (% of all forested area treated/decade)	0-3	3-6	6-8
Decrease Road Density (% of total road miles reduced/decade)	0-25	25-50	50+ change RDC
Watershed Restoration (% of all forested area treated/decade)	0-3	3-6	6-8
Prescribe Burning (% of all forested area treated/decade)	0-5	5-9	9-11
Prescribed Fire Plans (% of all forested area for which plans have been implemented)	0-20	20-40	40+

Key

Harvest = All commercial harvest methods (e.g. single tree selection, group selection, shelterwood, seed tree, overstory removal, clearcut, and commercial thinning from above or below.)

Thin = All pre-commercial thinnings used to alter forest structure, species composition, density, rate of growth, fuel ladders, fire behavior, etc.

Decrease Road Density = Permanent road closure.

Watershed Restoration = Includes increased road mtnce, improved road condition (surface and/or drainage), reduced road related erosion, road obliteration, increased LWM, riparian plantings, in-channel restoration, etc.

Prescribed Burning = Management ignited fire.

Prescribed Fire Plan = Allows natural ignition fires to burn when in prescription and/or identifies areas that require prescribed burning.

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Table 2R

Last Revised 2-17-96

Range Cluster
Activity Level Assumptions

	Low	Moderate	High
Livestock Management (% of all rangeland with improved management)	0-6	6-12	12-20
Improve Rangelands (% of all rangeland treated/decade)	0-4	4-8	8-11
Decrease Road Density (% of total road miles reduced/decade)	0-25	25-50	50+ change RDC
Riparian Restoration (% of all riparian areas treated/decade)	0-25	25-50	50-75
Prescribe Burning (% of all rangeland treated/decade)	0-3	3-6	6-9
Prescribed Fire Plan (% of all rangeland for which plans have been implemented)	0-20	20-40	40+

Key

Livestock Management = A summation of livestock management variables that affect rangeland health, including grazing systems, changing riparian grazing mgnt., season of use (length and timing), number of head, change of class, distribution, grazing deferment, and herding.

Improve Rangelands = Capital Investments: fencing, stockwater improvements, seedings, control of invasion or spread of exotics, and non-fire shrub and juniper control.

Decrease Road Density = Permanent road closure.

Riparian Restoration = Includes improving road condition (drainage and/or surface), riparian plantings, in-channel restoration, and riparian exclosures.

Prescribe Burning = Management ignited fire.

Prescribed Natural Fire = Allows natural ignition fires to burn when in prescription and/or identifies areas that require prescribed burning.

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Table 3 Last Revised 1-21-96

Changing Road Density Class

Calculations depicting the % of road closures necessary to effect a change in road density class

Class	Density (miles/sq. mile)	Mean Density	Multiplier (between classes)	% of roads that would have to be closed to drop one density class
None	0-.02	.006		
			10	90
Very Low	.02-.1	.06		
			7	80
Low	.1-.7	.4		
			3	70
Moderate	.7-1.7	1.2		
			2.5	60
High	1.7-4.7	3.2		
			2	50
Extreme	4.7+	6		

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Table 3-3. Summary: Comparison of Alternatives by Activity Level, by Cluster

Cluster/Activity	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Forest Cluster 1							
Harvest	L	L	L	L	L	L	L
Thin	L	L	L	L	L	L	L
Decrease Road Density	L	L	L	L	L	L	L
Watershed Restoration	L	M	M	M	M	M	L
Prescribed Burning	L	L	M	H	L	M	L
Prescribed Fire Plan	H	H	H	H	H	H	H
Forest Cluster 2							
Harvest	M	L	L	L	L	L	L
Thin	L	L	L	M	L	M	L
Decrease Road Density	L	L	M	M	L	M	M
Watershed Restoration	L	M	M	H	M	M	L
Prescribed Burning	L	L	M	H	M	M	L
Prescribed Fire Plan	H	H	H	H	H	H	H
Forest Cluster 3							
Harvest	H	M	M	M	M	L	L
Thin	M	L	M	H	H	M	L
Decrease Road Density	L	L	M	M	M	H	H
Watershed Restoration	L	M	M	M	M	M	L
Prescribed Burning	L	L	M	M	M	M	M
Prescribed Fire Plan	L	L	L	M	M	M	H
Forest Cluster 4							
Harvest	H	M	M	M	H	M	L
Thin	M	M	H	H	H	H	L
Decrease Road Density	L	L	M	M	L	M	M
Watershed Restoration	L	L	L	M	L	M	L
Prescribed Burning	L	L	L	M	L	M	M
Prescribed Fire Plan	L	L	L	M	L	M	M
Forest Cluster 5							
Harvest	H	L	M	M	M	L	L
Thin	M	M	H	H	H	H	M
Decrease Road Density	L	M	H	H	M	M	H
Watershed Restoration	L	L	L	M	M	M	L
Prescribed Burning	L	L	M	H	M	H	L
Prescribed Fire Plan	L	L	M	H	H	H	M
Forest Cluster 6							
Harvest	M	L	L	L	M	L	L
Thin	L	L	H	H	M	H	L
Decrease Road Density	L	L	L	M	L	L	L
Watershed Restoration	L	L	L	L	L	L	L
Prescribed Burning	L	L	M	M	M	M	M
Prescribed Fire Plan	L	L	M	M	L	M	M

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Range Cluster 1							
Livestock Management	L	M	M	M	L	M	H
Improve Rangeland	L	L	M	M	L	M	L
Decrease Road Density	L	L	L	H	L	M	M
Riparian Restoration	L	L	L	M	M	M	L
Prescribed Burning	L	L	M	H	L	H	M
Prescribed Fire Plan	L	L	M	H	H	H	H
Range Cluster 2							
Livestock Management	H	H	H	H	H	H	H
Improve Rangeland	L	L	L	L	L	L	L
Decrease Road Density	L	L	L	L	L	L	L
Riparian Restoration	L	L	L	M	L	M	L
Prescribed Burning	L	L	M	H	M	M	L
Prescribed Fire Plan	H	H	H	H	H	H	H
Range Cluster 3							
Livestock Management	M	H	H	H	H	H	H
Improve Rangeland	L	L	L	M	M	M	L
Decrease Road Density	L	L	L	M	L	L	M
Riparian Restoration	L	L	M	M	L	L	L
Prescribed Burning	L	L	M	H	M	M	L
Prescribed Fire Plan	L	L	M	H	M	H	H
Range Cluster 4							
Livestock Management	L	M	M	M	M	M	H
Improve Rangeland	L	L	L	M	L	M	L
Decrease Road Density	L	L	M	M	L	M	M
Riparian Restoration	L	L	L	M	M	M	M
Prescribed Burning	L	L	M	M	L	L	L
Prescribed Fire Plan	L	L	L	M	L	M	M
Range Cluster 5							
Livestock Management	L	M	L	M	M	H	H
Improve Rangeland	L	L	M	M	L	L	L
Decrease Road Density	L	L	L	L	L	L	L
Riparian Restoration	L	L	M	M	M	M	L
Prescribed Burning	L	L	M	M	L	M	M
Prescribed Fire Plan	L	L	L	M	L	M	H
Range Cluster 6							
Livestock Management	L	M	M	M	M	M	H
Improve Rangeland	L	L	M	H	M	M	L
Decrease Road Density	L	L	L	M	L	M	M
Riparian Restoration	L	L	M	M	M	M	M
Prescribed Burning	L	L	L	L	L	L	L
Prescribed Fire Plan	L	L	L	L	L	L	M

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Table 7 Last Revised 2-17-96

Alternative 5
"Priority Management" Areas

FOREST CLUSTER	PRIMARY Priority	SECONDARY Priority
1	Primitive Recreation	Aquatics
2	Aquatics	Recreation
3	Aquatics	Timber
4	Timber	Wildlife
5	Timber	Livestock
6	Wildlife	Recreation

RANGE CLUSTER	PRIMARY Priority	SECONDARY Priority
1	Livestock	Timber
2	Recreation	Aquatics
3	Recreation	Wildlife
4	Wildlife	—
5	Livestock	Recreation
6	Livestock	Wildlife

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Table 9 Last Revised 2-12-96

Overall Management Strategy by Alternative

(Summarization of General Management Emphasis by Forest Cluster)

Forest Cluster	ALTERNATIVE 1	2	3	4	5	6	7
1	C	C	C-R	C-R	C	C-R	C
2	P-C	C	R	R	C-R	R	C
3	P	P-C	R	R	R	R	C-R
4	P	P-C	R-P	R	P	R	C-R
5	P	C-R	R	R	R	R	C-R
6	P-C	C	C-R	R	R-P	C-R	C

Used to generate Alternative maps

Table 9R Last Revised 2-12-96

Overall Management Strategy by Alternative

(Summarization of General Management Emphasis by Range Cluster)

Range Cluster	ALTERNATIVE 1	2	3	4	5	6	7
1	P	P-C	R-P	R	R-P	R	C-R
2	C	C	C	C-R	C	C-R	C
3	P-C	C	C-R	R	C-R	C-R	C
4	P	P-C	R-P	R	P-C	R	C-R
5	P	P-C	R	R	P-C	C-R	C
6	P	P-C	R-P	R	R-P	R	C-R

Used to generate Alternative maps

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Table 10

Last Revised 2-10-96

HARVEST

ALTERNATIVES 1, 2 & 7

Forest Acres (M)	FOREST CLUSTER	ACRES (in thousands per decade) LOW 0-4%	MODERATE 4-8%	HIGH 8-10%
5,156	1	0-200	200-400	400-500
10,724	2	0-450	450-850	850-1,050
3,955	3	0-150	150-300	300-400
9,296	4	0-350	350-750	750-950
7,560	5	0-300	300-600	600-750
2,687	6	0-100	100-200	200-250

ALTERNATIVES 3, 4, 5 & 6

Forest Acres (M)	FOREST CLUSTER	ACRES (in thousands per decade) LOW 0-5%	MODERATE 5-9%	HIGH 9-11%
5,156	1	0-250	250-450	450-500
10,724	2	0-550	550-950	950-1,200
3,955	3	0-200	200-350	350-450
9,296	4	0-450	450-850	850-1,000
7,560	5	0-400	400-700	700-850
2,687	6	0-150	150-250	250-300

THIN

Forest Acres (M)	FOREST CLUSTER	ACRES (in thousands per decade) LOW 0-3%	MODERATE 3-6%	HIGH 6-8%
5,156	1	0-150	150-300	300-400
10,724	2	0-300	300-650	650-850
3,955	3	0-100	100-250	250-300
9,296	4	0-300	300-550	550-750
7,560	5	0-250	250-450	450-600
2,687	6	0-100	100-150	150-200

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PRESCRIBED BURNING

Forest Acres (M)	FOREST CLUSTER	ACRES (in thousands per decade) LOW 0-5%	MODERATE 5-9%	HIGH 9-11%
5,156	1	0-250	250-450	450-550
10,724	2	0-550	550-950	950-1,200
3,955	3	0-200	200-350	350-450
9,296	4	0-450	450-850	850-1,000
7,560	5	0-400	400-700	700-850
2,687	6	0-150	150-250	250-300

WATERSHED RESTORATION

Forest Acres (M)	FOREST CLUSTER	ACRES (in thousands per decade) LOW 0-3%	MODERATE 3-6%	HIGH 6-8%
5,156	1	0-150	150-300	300-400
10,724	2	0-300	300-650	650-850
3,955	3	0-100	100-250	250-300
9,296	4	0-300	300-550	550-750
7,560	5	0-250	250-450	450-600
2,687	6	0-100	100-150	150-200

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Table 10R

Last Revised 2-10-96

LIVESTOCK MANAGEMENT

Forest Acres (M)	RANGE CLUSTER	ACRES (in thousands per decade) LOW 0-6%	MODERATE 6-12%	HIGH 12-20%
1,632	1	0-100	100-195	
103	2	0-6	6-12	12-20
107	3	0-6	6-12	12-20
32	4	0-2	2-4	
13,367	5	0-800	800-1,600	1,600-2,670
14,640	6	0-880	880-1,760	1,760-2,925

IMPROVE RANGELANDS

Forest Acres (M)	RANGE CLUSTER	ACRES (in thousands per decade) LOW 0-4%	MODERATE 4-8%	HIGH 8-11%
1,632	1	0-65	65-130	130-180
103	2	0-5	5-10	
107	3	0-5	5-10	
32	4	0-5		
13,367	5	0-535	535-1,070	1,070-1,470
14,640	6	0-585	585-1,170	1,170-1,610

PRESCRIBED BURNING

Forest Acres (M)	RANGE CLUSTER	ACRES (in thousands per decade) LOW 0-3%	MODERATE 3-6%	HIGH 6-9%
1,632	1	0-50	50-100	100-150
103	2	0-5	5-10	
107	3	0-5	5-10	
32	4	0-5		
13,367	5	0-400	400-800	
14,640	6	0-440	440-880	

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RIPARIAN RESTORATION

RANGE CLUSTER	ACRES (in thousands per decade) LOW 0-25%	MODERATE 25-50%	HIGH 50-75%
1	0-10	10-20	
2	0-1		
3	0-1		
4	0-1		
5	0-65	65-135	
6	0-75	75-145	

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Desired Range of Future Conditions

Alternative 1 — No Action

The following Desired Range of Future Conditions (DRFC) was derived from the various individual land-use plans and represents a general summary of conditions expected under those plans, intended as a comparison to the DRFCs expected under the action alternatives. However, no single current plan contains all of the DRFC items listed below. For precise wording of desired future conditions for an individual Forest or BLM District, consult the appropriate plan.

Social

Many forested areas include Wilderness, scenic areas, Research Natural Areas, unroaded lands, old growth reserves, and other locations not subject to timber management activities. These areas would be influenced by fire, natural events, recreation, and other uses. Larger expanses of forests in middle to late structural stages will be evident, with patches of intolerant or climax species. Other areas will show more open, subclimax seral stages due to extensive use of prescribed fire. Some areas show evidence of younger seral stages due to stand replacing wildfire. Prescribed and natural fires and other activities have reduced evidence of forest insect and diseases in most areas.

All plans identify areas where varied recreational opportunities from wilderness, special interest areas, non-motorized and roadless areas, and motorized dispersed activities are provided. National Forests and BLM Districts also provide developed recreation areas and facilities and have programs that seek to maintain scenic quality. National Forests along the Cascade crest emphasize management of recreation and wilderness resources. Certain lands and features are identified and incorporated into a system of classified or special interest areas, areas of critical environmental concern, or research natural areas to protect and manage unique values such as scenic quality, wildlife, raptors, sensitive plants, historic sites, cultural resources, recreation opportunities, and others. Wilderness and Wild and Scenic Rivers have also been designated, or found administratively suitable for designation, and managed to conserve their values.

Changing forest and rangeland conditions also influence recreation activities, settings, and experience opportunities. At the same time, demand for recreation of all types will grow substantially. Both agencies respond to this increased demand by providing additional recreation opportunities. In some areas more roads provide a base of roaded recreation opportunities, heavily used and very popular. In other areas, increased road closures provide for more primitive or semi-primitive opportunities. Additional developed facilities, restored and maintained recreation sites, expanded and well maintained trail systems, and new winter use areas are a few of the means used to meet the demand. Visual quality will be emphasized in the important recreation and related areas; natural appearing conditions featuring larger trees or other desirable vegetation will be created and maintained through management. Some reduction in the amount of unroaded area has occurred. But wilderness, unroaded and other areas continue to meet some of the demand for primitive opportunities across the region. However, frequency of encounters will be noticeably increased. All areas continue to emphasize their feature attractions such as wild rivers, scenic areas, wildlife and fish, botanical, geologic and historic areas and interpreted cultural resource properties.

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Economics

The "traditional" industries that use and produce resources from public lands will continue to contribute to rural economic activity. Economic activity will be focused on recreation, timber, livestock forage, water, and other locally and regionally important resources.

Resource Management

Forests, shrub, and grass lands managed by the cooperating agencies continue to provide a mix of natural resource-based goods and services. Management focuses on providing resource outputs including timber, livestock forage, huntable wildlife, and minerals while also providing for other multiple uses and values including aesthetics, recreation opportunities, wildlife, and clean air and water. Current management has improved some conditions on public lands. Resource management emphasis continues to vary among National Forests and BLM Districts based on the character of the land and resources, and public interests.

On National Forest and BLM forested areas, the general thrust is to emphasize or accommodate sustained timber, wood fiber, and livestock forage production in an environmentally prudent manner, while managing and protecting other resources and values. Under this approach, timber harvest and livestock outputs are planned to be near levels produced at the time plans were approved. Timber production is planned only in areas classified as suitable for such production. Because BLM, and some National Forests, management tends to be more in grass and shrub land areas, their general perspective is to produce forage for livestock grazing, wildlife, and wild horses at or near levels when plans were approved. Under current management, timber and livestock management are integated and coordinated with the maintenance or enhancement of wildlife and fish habitat, scenic quality, recreation opportunities, and other resource values to achieve overall, multiple-use goals and objectives.

In general, most lands are open and accessible for mineral resource and gas and oil exploration and development, provided that unnecessary and undue degradation of public lands does not result from operations.

Riparian Areas

Riparian areas and stream habitat conditions have improved as a result of protection and management, including extensive stream habitat enhancement and restoration work. Management has promoted desirable riparian vegetative species, density and structural conditions, floodplain and bank stability and resiliency, appropriate sediment budgets and water temperatures, and channel morphological processes and characteristics. All conditions interact to support improved habitat, benefiting fish and wildlife across the region. Improved riparian and instream conditions move fish habitat capability toward its potential. Some previously imperiled and other sensitive fish species show an increasing or stable trend in abundance and distribution.

Uses are coordinated to enhance fisheries, water quality, and riparian resources, focusing on maintaining, protecting, and restoring natural functions to achieve healthy and productive ecological conditions. Many Forests and BLM Districts plan to maintain or enhance fish habitat capability and riparian resources, often through restoration and improvement activities.

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Soil and Water

Across the region, soil function, processes and productivity is maintained or improved through application of prevention mitigation, or restoration measures. Effective ground cover is present in amounts and distribution to prevent erosion. Water quality is enhanced through management, so that most streams are providing cool, clear, clean water. Quality water is even more precious than at present; demand will be high from all users. However, the available water supply from forest and rangelands remains essentially unchanged, although summer low flows are increased. In the long-term, air quality is good. Although use of prescribed burning has increased, application of best management practices, expanded fiber utilization, and reduced catastrophic wildfire contribute toward quality air.

Protection and maintenance of soil and water resources and productivity is emphasized by all National Forests and BLM Districts.

Rangelands

Grass-shrub uplands evidence steady improvement and positive trends in vegetative and ecologic conditions. Rangelands have increased amount and production of desirable shrubs, forbs, and grasses and improved structural diversity. Downward trends have been arrested, damaged conditions restored, and the spread of invasive and noxious weed has been slowed or stopped. Most areas are meeting or moving toward objectives. Changes have occurred through active grazing management and range betterment activities. As a result, authorized livestock forage use levels are near current levels, and output levels are maintained on a sustained basis.

Other DRFC elements include:

- Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, and landform.
- Riparian-wetland areas are in properly functioning condition.
- Stream channel morphology (including but not limited to gradient, width/depth ratio, channel roughness and sinuosity) and functions are appropriate for the climate and landform.
- Healthy, productive and diverse populations of native species exist and are maintained.

Forestlands

Forests feature a diversity of stand conditions. Portions of the landscape are heavily influenced by commodity production and recreation use, while other locations are largely natural appearing. On lands suitable for timber production, forests show evidence of management activity at the stand level. Use of available technologies result in a forest managed to favor seral species (such as ponderosa pine, lodgepole pine, western larch, Douglas-fir) with reduced stand densities, improved growth and yields, restored and maintained soil productivity, and prompt reforestation achieved with genetically improved trees. Use of prescribed fire and thinning to manage vegetation and reduce fuel loads and ladders is also evident. Some areas emphasize evenaged stand management. Horizontal diversity exists with a variety of stand patch sizes (<40 acres) and shapes visible. Stands are in a range of seral structural condition, primarily early (regenerated stands) to middle stages (stands near 20" dbh and up to 120 years old). Vertical diversity and a more naturally appearing forest, with larger, older trees and several canopy layers exist in areas where unevenaged management is emphasized, or long rotations are used. As a result of man-

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agement over the long-term, projected annual timber yields of desired timber sizes and quality are produced; long-term timber harvest sustainability is attained. Increased transitory forage will be available for livestock, big game, and other wildlife use.

Disturbances

As a result of prescribed fire, thinning and insect abatement efforts, the health, vigor, and diversity of the forest has improved. Disturbance events, including fire, insects, and diseases are within or close to natural range of variation and effect. Ecosystems are healthier and have improved function. Resistance to epidemics has increased and undesirable impacts of insects, diseases, and weeds have been mitigated through integrated pest management.

Wildlife Habitat

The amount and diversity of wildlife habitat will be maintained or improved through time. Late/old seral forests, and grass-shrublands, exist in varying sized blocks and well distributed patterns across the landscape. Snags and dead/down tree habitat continues to be available at planned and sustained levels. Some decline in old growth and dead/down tree dependent species populations will occur where intensive forest management activities reduce the total amount of these key habitats. Big game species continue to be featured in many areas. Ongoing management of forest and rangeland habitat components and conditions (such as vegetative cover, forage, and roads), and key areas maintain big game populations near state wildlife agency objectives. Hunting continues to be enjoyed throughout the region. Improved forest, grass-shrubland, and riparian area conditions support and benefit a variety of other species by increasing the quality, quantity, and variety of habitat. Such species include water fowl, upland game, raptors, and nongame species. Management has helped to create the long-term changes and improvements that contribute toward restoring some sensitive species, and toward recovery of several listed species.

On many Forest and BLM Districts, big game habitat needs are emphasized through management of vegetation to achieve specified conditions. Old growth, dead and down tree habitats and late successional tall shrub habitats are provided. In timber harvest areas, old growth and dead and down tree habitat is retained to meet wildlife requirements (See R-6 Regional Guide and NFMA 36 CFR 219.27).

Alternative 2

Under Alternative 2 forests and rangelands managed by the Forest Service and BLM continue to provide a mix of natural resource based goods and services. Rangelands show improving conditions and trends discussed in Alternative 1 desired future conditions. On forests areas not subject to timber management activities, desired future conditions are also the same as described in Alternative 1. On areas subject to timber management and/or areas within designated riparian areas of key/priority watersheds, some differences in DFCs (from Alternative 1) apply.

The following DRFC applies to Forest Service- or BLM-administered lands identified in PACFISH and INFISH. The DRFC is to maintain or restore:

1) Water quality to a degree that provides for stable and productive riparian and aquatic ecosystems;

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2) Stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic ecosystems developed;

3) Instream flows to support healthy riparian and aquatic habitats, the stability and effective functioning of stream channels, and the ability to route flood discharges;

4) Natural timing and variability of the water table elevation in meadows and wetlands;

5) Diversity and productivity of native and desired non-native plant communities in riparian zones;

6) Riparian vegetation to:

   a) provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems
   b) provide adequate summer and winter thermal regulation within the riparian and aquatic zones;
   c) help achieve rates of surface erosion, bank erosion, and channel migration characteristic of those under which the communities developed;

7) Riparian and aquatic habitats necessary to foster the unique genetic fish stocks that evolved within the specific geoclimatic region;

8) Habitat to support populations of well-distributed native and desired non-native plant, vertebrate, and invertebrate populations that contribute to the viability of riparian-dependent communities.

Desired Range of Future Conditions Common to Alternatives 3-7

The desired range of future conditions (DRFC) is a summary of the conditions desired or expected in 50 to 100 years as a result of meeting objectives. The DRFC is expressed as a range of processes and/or conditions that provide a vision of the long-term condition of the land.

The following DRFC applies to ALL action alternatives. In addition, each alternative will be described by a specific DRFC that is expected in 50-100 years.

- State and Federal resource management-related legal requirements are met.

- Tribal treaty rights and other Federal trust responsibilities are met.

- State, county, and tribal governments are involved in Federal agency planning, decision-making, and implementation of programs.

- A broad range of recreational opportunities are available.

- Vegetation and fuel management strategies reduce the risk of life and property loss from wildfire.

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- There is no downward trend in quality and quantity of riparian areas, wetlands, and lakes. Some are showing an upward trend.

- Water quality meets Clean Water Act requirements and State water quality standards and contributes to habitat quality and stream and lake conditions.

- Most soils have at least minimal protective cover, soil organic matter, and coarse woody material (in woodlands and forests). Soils have adequate physical properties for vegetation growth and hydrologic function. Physical, chemical, and biological processes in most soils function similarly to soils that have not been harmfully disturbed. Microbiotic crusts are stable or increasing in coverage on all suitable sites.

- In the dry forest type, stand density, species composition, structure, fuel loading and distribution, and duff depth are moving toward that which is typically associated with a natural fire regime. The majority of fires are nonlethal underburns, generally occurring on more gentle terrain and rocky areas at less that 25 year intervals. Some lethal fires, that kill the overstory, continue to occur where topography funnels winds, in geographically windy areas, or low productivity sites where trees rarely become tall enough for their crowns to survive flames. The smallest proportion of fires are mixed severity.

- Dominant species in the dry forest type are resistant to low intensity fires. Stands of ponderosa pine are pure mixed with Douglas-fir or grand fir. The dry forest group is predominately an open community.

- In the moist forest type, mixed severity fires occur intermingled with surface and crown fires. Stand density, species compositions, structure, fuel loading and distribution, and duff depth are moving toward that which is typically associated with the natural and highly variable fire regime. The majority of fires are mixed severity at intervals ranging from 25 to 150 years. Nonlethal fires occur on benches and ridges, and fires lethal to the overstory occur on upland slopes.

- Dominant species in the moist forest type are resistant to low and moderate intensity fires. Stands of Douglas-fir, lodgepole pine, or ponderosa pine are pure or mixed with western larch, western white pine, grand fir/white fir, western hemlock/western redcedar or Engelmann spruce/subalpine fir.

- In the cold forest type, stand density, species composition, structure, fuel loading and distribution, and duff depth are moving toward that which is typically associated with a natural fire regime. Nonlethal underburns occur on benches and ridges where whitebark and lodgepole pine dominate. The lethal crown fire regime is found on moist to wet steep slopes. The most common fires are mixed severity, which usually occur intermingled with nonlethal and lethal fires during one or a series of fire events, with a frequency ranging from 25 to 150 years.

- Dominant species in the cold forest type are somewhat resistant to low intensity fires. Stands of lodgepole pine, Douglas-fir, or whitebark pine are pure or mixed with Engelmann spruce/subalpine fir, mountain hemlock, whitebark pine/subalpine larch, or aspen.

- Annual rate of spread of new infestations of noxious weeds is declining in response to aggressive weed management programs.

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- Dense shrublands are reduced in extent.
- Juniper encroachment into previously unoccupied communities is declining.
- Shrub communities are of sufficient size and of appropriate arrangement to enhance connectivity among similar habitats.
- Species viability is not limited by habitat conditions.
- Natural Areas and habitats supporting high species endemism or biodiversity are present and contribute to species viability.
- There are fewer roads in riparian areas and in the uplands, where road miles causing accelerated erosion have been reduced. Riparian areas are stable and free of alteration to the natural streamflow and sediment regimes. In some areas, open roads are stable.
- Watersheds are stable and provide for the capture, storage and safe release of water appropriate to soil type, climate, and landform.
- Healthy, productive and diverse populations of native plants are maintained or obtained relative to site potential.
- Rangelands reseeded with mixtures including nonnative plants are functioning to maintain adequate life form diversity, production, nutrient cycling, energy flow, and the hydrologic cycle.
- Monocultures of undesirable plants (cheatgrass, medusahead wildrye, and noxious weeds) at least provide for soil stability and offer opportunitites for improved vigor and numbers of remnant native or seeded plants relative to site condition.
- Habitats are suitable to maintain viable populations of listed and sensitive species.
- Riparian/wetland vegetation structure and diversity are, or are making significant progress toward, functioning properly.
- Stream channels and floodplains are, or are making significant progress toward, functioning properly.
- Surface and groundwater on public lands fully support, or are making significant progress toward fully supporting, designated beneficial uses described in the State water quality standards.
- **Category 1 Watersheds:** Watershed processes, riparian and aquatic habitat conditions, and their interactions provide habitat conditions that support strong populations of native species. Although previously introduced species are present, they do not dominate the aquatic community. Large blocks of continuous high quality, diverse habitat is provided spatially and temporally within the watersheds. Connectivity within the watershed is at least maintained, and all native aquatic biota are present, including migratory forms. These watersheds provide a system of habitats large enough and well dispersed enough to be resilient in the face of large-scale disturbance. Category 1 watersheds provide conditions necessary for the long-term persistence of native aquatic communities and are important sources for refounding populations in other water-

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sheds. While human disturbances (management activities) have and do occur, natural processes predominate or are not altered to a point beyond that which the native biota evolved and can persist over the long term. Past management activities which affect watershed processes and aquatic and riparian habitats are mitigated, and new management activities do not affect watershed processes in a manner that would be adverse to aquatic biota.

Alternative 3

In addition to the DRFC elements common to all action alternatives, the following is the vision of the long-term (50-100 years) condition of the land under Alternative 3:

FOREST

In the *dry forest Potential Vegetation Group (PVG),* successional and disturbance processes are maintained through endemic insect and disease disturbances, vegetation management on high priority sites to re-establish dominance of old single story ponderosa pine, and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
60-70%	10-20%	15-25%

There is a moderate abundance and persistence of old single story forest, dominated by ponderosa pine with a moderate component of Douglas-fir and a minor component of grand fir. Stands are fairly well distributed in a mosaic of age classes (table A).

In the *moist forest PVG*, successional and disturbance processes are maintained through endemic insect and disease disturbances, windthrow often aided by root rot, vegetation management on high priority sites to re-establish western white pine, and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
5-15%	30-40%	50-60%

There is a moderate abundance and persistence of young forest consisting of western white pine, western larch, and ponderosa pine with a minor component of grand fir. Stands are distributed in a mosaic of age classes (table A).

In the *cold forest PVG*, successional and disturbance processes are maintained through endemic and epidemic insect and disease disturbances, vegetation management on high priority sites to re-establish whitebark pine, and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
5-15%	15-25%	65-75%

There is a moderate component of young forest consisting of seral whitebark pine along with Engelmann spruce/subalpine fir. Stands are distributed in large-patch mosaics of age classes (table A).

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The forested potential vegetation groups have an overall range of structural stages as follows:

Table A. Desired Structural Stages, Alt. 3

PVG	Regen	Young	Old Multi	Old Single	Other*
Distribution (expressed as a % of the PVG)					
Dry	10-20	25-35	20-30	20-40	0-15
Moist	15-25	50-60	15-25	5-15	
Cold	15-25	45-55	20-30	5-10	1-2
Shade-Intolerant Species (expressed as a % of the structural stages)					
Dry	90-100	60-70	50-70	90-100	
Moist	75-85	70-75	50-75	90-100	
Cold	75-80	60-70	35-50	80-100	
*refers to understory of grasses, shrubs, forbs					

Forest wildlife habitat. The needs of forest-dependent wildlife species are met by the presence of the necessary structures and composition, ecological processes, and ecosystem functions. Forested land contains habitat attributes of old forests. Natural areas with high species endemism or biodiversity are present and contribute to species viability and the delisting of threatened or endangered species. Amounts and distribution of habitat attributes are increased where needed to meet the needs of endemic species and species with the largest home range requirements. Some blocks of old forest habitats connect areas of similar vegetation. Human activities are at levels that allow sufficient useable habitat for all species to be represented and well distributed, although species densities may be variable. Management activities are dispersed, except in areas following major disturbances such as large fires and insect infestations. In many forest areas, some roads are closed (seasonal or permanent), or located to achieve the desired wildlife habitat conditions.

RANGELANDS

Rangelands reflect a mosaic of multiple-aged shrubs, forbs, and native and exotic perennial grasses. There is a slight management emphasis on maintaining a grass-dominated plant community in the shrublands, although forbs and shrubs are a substantial part of the plant community. Most seedings have been diversified by the addition of various forb and shrub species. New infestations of noxious weeds, especially when located in vegetation types highly susceptible to invasion, are controlled, but most existing large infestations remain and continue to spread along their boundaries. Control that results in some reduction of existing large infestations is prioritized at a site-specfic level and directed by local input, especially for species that are problematic on a project area-wide level (yellow starthistle, diffuse knapweed, spotted knapweed, and leafy spurge).

Western juniper is being reduced by various treatments on rangelands. Yet, the overall amount remains about the same since the extent of new invasions equals the extent of existing juniper-dominated areas being treated.

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Microbiotic crust cover is improving in shallow soil areas. Microbiotic crusts are not declining in other rangeland plant communities. Prescribed burning and prescribed natural fire is apparent, although the burning is not continuous and is prescribed as mosaic. Altered sagebrush steppe is maintained at existing levels with emphasis on preventing the spread of cheatgrass to adjacent areas. Greenstripping and other fire breaks are apparent along roads and along the altered sagebrush steppe boundaries.

Potential Vegetation Groups (PVGs)

Dry Grass PVG

Forty to 60 percent of the fires in this group are nonlethal, burning in hebaceous vegetation at less than 25-year intervals. The remaining fires are lethal, or mixtures of nonlethal and lethal, causing mortality of overstory shrubs or conifers. Fifty to 70 percent of the area is dominated by native grasses and forbs with minimal conifer and shrub encroachment.

Dry Shrub PVG

About 85-95 percent of the fires in this group are lethal, causing overstory mortality in stages dominated by shrubs and conifers at 25- to 75-year intervals. On perennial bunchgrass dominated sites, nonlethal fires predominate at 25- to 75-year intervals.

Forty to 60 percent of the area in this group is dominated by native grasses and forbs with an overstory layer of shrubs. Five to 20 percent of the area is dominated by native grass and forb communities. The remaining area is dominated by dense shrub communities with declining herbaceous layers, by annual grasses, or by seedings of exotic grasses and other plants.

Cool Shrub PVG

Eighty to 95 percent of fires in this group are lethal, causing overstory mortality in stages dominated by shrubs and conifers at 26- to 150-year intervals, with higher frequencies on more productive sites. Five to 15 percent of fires are nonlethal within herbaceous-dominated stages at intervals of less than 25 years.

Fifty to 70 percent of the area in this group is dominated by native grasses and forbs with an overstory layer of shrubs. Ten to 30 percent of the area contains mixtures of perennial grasses and forbs. Conifers are dominant on less than 20 percent of the area.

Rangeland wildlife habitat. Rangelands have the necessary structure and composition, ecological processes, and ecosystem functions to meet most needs of Federal and State listed and sensitive rangeland-dependent wildlife species. To enhance wildlife forage production, rehabilitation or restoration of native perennial bunchgrass has been accomplished. Natural Areas and areas of high species endemism or biodiversity are present and contribute to species viability, but gains in species viability are moderate. Vegetation is appropriate for the site with multiple age classes of shrubs and grass being common. These habitats are becoming less fragmented and more connected due to increasing abundance of native vegetation. Blocks of similar habitats are fairly well connected with areas of similar vegetation. Human activities are at a level that allows most species to maintain a desired distribution, but species densities may be low. In many rangeland areas, roads are closed or located to achieve the desired resource conditions. Management activi-

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ties are dispersed and infrequent. In some situations, human activities require seasonal restrictions in selected habitats.

SOCIAL AND ECONOMIC

Social and economic systems are minimally affected by adjustments or updates to Forest Service of BLM land-use plans.

Local public needs and desires continue to influence levels of commodity and noncommodity outputs.

Customary uses continue and stability improves for the participant customers (firms, ranches, etc.).

Reductions in commodity outputs are minimized and reflect either changes in ecosystem health or minimum levels needed to achieve compliance with applicable laws and regulations.

Payments to local units of governments continue and generally are stable within a normally accepted range.

AQUATIC — RIPARIAN — WATERSHEDS

Riparian areas in Proper Functioning Condition are managed to maintain that condition, within their site potential, with no downward trends. Tall trees, moderate or large in diameter, within riparian areas are infrequent. Some riparian areas are connected to the streams and uplands, unfragmented by roads and openings, and free of barriers to species migration. On rangelands, some riparian area soils are vegetated with native deep-rooted plants and shrubs. Riparian woodlands are rare but increasing on forested lands. Wetlands are stable but not common across the lower gradient valley bottoms.

Forested streams in Category 2 and portions of Category 3 watersheds are moderately productive and habitat is becoming complex and diverse, supporting native aquatic species. Instream, bank, and overhead cover, and structure provided by large wood and willows, are moderate and increasing. Large deep pools in lower gradient streams are fairly common. Rangeland streams and forested streams in portions of Category 3 watersheds are low in productivity, and have habitat that is simple and uniform, supporting aquatic species that require low to moderate quality habitat. Instream, bank, and overhead cover, and structure provided by large wood and willows, are low to moderate. Substrate is largely homogeneous and tends to be of finer size than characteristic for the geoclimatic setting. Large deep pools in lower gradient streams are infrequent.

Some portions of the landscape have minimal protective soil cover, organic matter, and coarse woody material. Most biomass is stored in smaller plant parts and as litter. Vegetative growth and hydrologic function are moderately impaired in some areas.

Roads in riparian areas are frequent but stable. Some road corridors from new roads are apparent. The landscape is moderately fragmented in appearance. Riparian vegetation separate and disconnected from upslope vegetation.

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Aquatic species habitat. Water quality and aquatic habitat are moving towards watershed, riparian, and aquatic habitat goals within Category 2 and portions of Category 3 watersheds. Restoration strategies are implemented on nearly all high-risk sites within Category 2 watersheds, allowing recovery of watershed, riparian, water quality, and aquatic conditions characteristic for the geoclimatic setting. Improved aquatic habitat conditions allow threatened or endangered (TES) aquatic species populations to stabilize and expand. Major river corridor habitat and water quality conditions are improving.

The following DRFC applies to Forest Service- or BLM-administered lands identified in PACFISH and INFISH. The DRFC is to maintain or restore:

1) Water quality to a degree that provides for stable and productive riparian and aquatic ecosystems;

2) Stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic ecosystems developed;

3) Instream flows to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges;

4) Natural timing and variability of the water table elevation in meadows and wetlands;

5) Diversity and productivity of native and desired non-native plant communities in riparian zones;

6) Riparian vegetation to:
   a) provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems;
   b) provide adequate summer and winter thermal regulation within the riparian and aquatic zones;
   c) help achieve rates of surface erosion, bank erosion, and channel migration characteristic of those under which the communities developed;

7) riparian and aquatic habitats necessary to foster the unique genetic fish stocks that evolved within the specific geoclimatic region;

8) habitat to support populations of well-distributed native and desired non-native plant, vertebrate, and invertebrate populations that contribute to the viability of riparian-dependent communities.

Alternative 4

In addition to the DRFC elements common to all action alternatives, the following is the vision of the long-term (50-100 years) condition of the land under Alternative 4:

FOREST

In the *dry forest Potential Vegetation Group (PVG)*, successional and disturbance processes are restored and maintained through aggressive vegetation management, endemic insect and disease disturbances, and fire. Forest species and composition are consistent with the following fire regime:

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Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
75-85%	5-15%	5-15%

There is an abundance and persistence of old single story forest, dominated by ponderosa pine with a moderate component of Douglas-fir and a minor component of grand fir. Stands are well distributed in a mosaic of age classes (table B).

In the *moist forest PVG*, successional and disturbance processes are restored and maintained through aggressive vegetation management; endemic insect and disease disturbances; windthrow, often aided by root rot; and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
10-20%	20-30%	55-65%

There is an abundance and persistence of old forest dominated by Douglas-fir, lodgepole pine, and ponderosa pine in the single story structural stage. Seral western white pine dominates the young forest structural stage. Stands are well distributed in a mosaic of age classes (table B).

In the *cold forest PVG*, successional and disturbance processes are maintained through endemic insect and disease disturbances, vegetation management, and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
5-15%	5-15%	75-85%

There is an abundance and persistence of old forest dominated by lodgepole pine and Douglas-fir in the multi-layer structural stage, and the young forest stages are dominated by seral whitebark pine with a moderate component of Engelmann spruce/subalpine fir. Stands are distributed in large-patch mosaics of age classes (table B).

The potential vegetation groups have an overall range of structural stages as follows:

Table B. Desired Structural Stages, Alt. 4

PVG	Regen	Young	Old Multi	Old Single	Other*
Distribution (expressed as a % of the PVG)					
Dry	5-15	30-40	10-20	35-50	0-15
Moist	20-30	40-50	20-30	10-20	
Cold	15-25	35-45	25-35	5-15	1-2
Shade-Intolerant Species (expressed as a % of the structural stages)					
Dry	90-100	60-70	50-70	90-100	
Moist	75-85	70-75	50-75	90-100	
Cold	75-80	60-70	35-50	80-100	
***refers to understory of grasses, shrubs, forbs**					

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Forest wildlife habitat. The needs of forest-dependent wildlife species are met by the structure and composition, ecological processes, and ecosystem functions. Habitat attributes of old forests are abundant. Natural Areas with high species endemism or biodiversity are common and contribute to species viability and the delisting of threatened or endangered species. Management is designed to increase amounts and distribution of habitat attributes where needed to be sufficient to meet the needs of endemic species and species with the largest home range requirements. Blocks of old forest habitats are large and connect with areas of similar forest types. Human activities are at levels that allow most species to maintain an adequate distribution in forested environments. In the long term, management activities are dispersed and infrequent; in the short term, management activities are common. In many forest areas, many roads are closed (seasonal or permanent), or located to achieve the desired wildlife habitat conditions.

RANGELANDS

Rangelands reflect a mosaic of multiple-aged shrubs, forbs, and native grasses with management emphasis on maintaining a diverse native plant community. Seedings have been diversified by the addition of various native grasses, forbs, and shrubs, and have been converted to native plants where possible. New infestations of noxious weeds are not common across the landscape and existing large infestations are slowly declining.

Western juniper-dominated sites are rare across the rangelands. The exception to this is rock outcrops, ridges, mesas, or other areas not prone to fire, which typically have shallow soils with little accumulation of fine fuels. Some areas have diverse plant communities with low densities of western juniper as well as a full complement of native understory shrubs, grasses, and forbs.

Microbiotic crust cover has improved in all dry shrub types. Microbiotic crusts are also increasing in other rangeland plant communities. Prescribed burning and prescribed natural fire have maintained the diverse, mosaic shrub steppe plant communities as well as the grassland communities that are subject to conifer encroachment. Most of the altered sagebrush steppe consists of diverse perennial plant communities, with the grass components dominated by both native and exotic perennial grasses. Greenstripping and other fire breaks are still apparent along roads and along the remaining altered sagebrush steppe boundaries.

Potential Vegetation Groups

Dry Grass Potential Vegetation Group

At least 60 to 80 percent of the fires in this group are nonlethal, burning in herbaceous vegetation at less than 25-year intervals. The remaining fires are lethal, or mixtures of nonlethal and lethal, causing mortality of overstory shrubs or conifers. Sixty to 80 percent of the area is dominated by native grasses and forbs without conifer and shrub encroachment.

Dry Shrub Potential Vegetation Group

About 80-90 percent of the fires in this group are lethal, causing overstory mortality in stages dominated by shrubs and conifers at 25- to 75-year intervals. On perennial bunchgrass dominated sites, nonlethal fires predominate at 25- to 75-year intervals.

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Fifty to 70 percent of the area in this group is dominated by native grasses and forbs with an overstory layer of shrubs. Ten to 25 percent of the area is dominated by native grass and forb communities. The remaining area is dominated by closed shrub communities with declining herbaceous layers, by seedings of exotic and native grasses and other plants, and in a small area by annual grasses and noxious weeds.

Cool Shrub Potential Vegetation Group

Seventy to 90 percent of fires in this group are lethal, causing overstory mortality in stages dominated by shrubs and conifers at 16- to 150-year intervals, with higher frequencies on more productive sites. Ten to 30 percent of fires are nonlethal within herbaceous-dominated stages at intervals of less than 25 years.

Sixty to 80 percent of the area in this group is dominated by native grasses and forbs with an overstory layer of shrubs. Fifteen to 40 percent of the area contains mixtures of perennial grasses and forbs. Closed canopy sagebrush and conifers dominate the remaining area.

Rangeland wildlife habitat. Rangelands have the necessary structure and composition, ecological processes, and ecosystem function to meet most needs of Federal and State listed and sensitive rangeland-dependent wildlife species. The distribution of different amounts and ages of shrubs, grassland, and woodland are approaching desired levels in a mosaic pattern. Rehabilitation or restoration of native shrub communities are accomplished where site potential permits to enhance wildlife habitat. Natural areas and areas of high species endemism or biodiversity are common and contribute to species viability, but gains in species viability are moderate. Vegetation is appropriate for the site with multiple age classes of shrubs and grass being common. These habitats are becoming less fragmented and more connected due to increasing abundance of native vegetation. Areas are large and connected with other areas of similar vegetation to maintain species distribution and densities that are closely associated with rangeland habitats. Human activities are at a level that allows species to maintain expected distribution, but some species densities may be low due to human activities. In many areas roads are closed or located to reduce habitat fragmentation and reduce human disturbance; road densities are low in many areas. Blocks of similar habitats are large and connect with areas of similar vegetation. In many areas roads are closed, (seasonally or permanently) or located to achieve the desired wildlife habitat conditions.

SOCIAL AND ECONOMIC

Social and economic systems have adjusted (in some locations grown) to the changed amounts and product mix of commodity and noncommodity outputs. Enhanced forest, range, riparian and aquatic ecosystems enable individuals and firms to obtain social and economic benefits from sustained levels of management projects and restoration actions.

Local public needs and desires are reconciled with the Federal agencies' ecosystem restoration needs and opportunities.

Payments to local units of governments continue within an acceptable range based on local conditions and need for restoration.

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AQUATIC — RIPARIAN — WATERSHEDS

Riparian areas are resilient, diverse, and functioning within their site potential. Riparian areas in Proper Functioning Condition are managed to maintain that condition with no downward trends, and there is an annual increase in the number of areas functioning at risk that show an upward trend towards Proper Functioning Condition. Less resilient and more sensitive areas are recovering. Tall trees, moderate or large in diameter, within riparian areas are fairly frequent. Riparian areas are covered by protective vegetation and generally connected with their streams and upslopes.

Most soils have protective cover, adequate levels of soil organic matter, and coarse woody material distributed in varying sizes and types. Soils also have adequate physical properties for vegetation growth and hydrologic function. Physical, chemical, and biological processes in all soils function similarly to soils that have not been harmfully disturbed.

Roads in riparian areas are few and stable. Roads exist in riparian areas only under the following circumstances: where needed for major public transportation thoroughfares, where they do not cause problems to aquatic and riparian resources, or where there are no other practical alternatives. Some road corridors from new roads are apparent, but roads in sensitive landscapes are few and stable. There is moderate-to-strong evidence of human management activity across the landscape.

Aquatic species habitat. Restoration strategies are implemented on nearly all high risk sites within Category 2 and portions of Category 3 watersheds, promoting recovery of watershed, riparian, water quality and aquatic conditions characteristic for that geoclimatic setting. Improved aquatic habitat conditions allow threatened and endangered aquatic species populations to stabilize and expand into previously occupied habitat. Native aquatic species population's strongholds are increasing basin-wide. Major river corridor conditions allow most aquatic species to achieve their full life cycles.

The following DRFC applies to Forest Service- or BLM-administered lands identified in PACFISH and INFISH. The DRFC is to maintain or restore:

1) Water quality to a degree that provides for stable and productive riparian and aquatic ecosystems;

2) (a) Sediment regimes that are appropriate to geoclimatic setting. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.
(b) Hydrologic regimes in streams, lakes, and wetlands appropriate to the geoclimatic setting. Important elements of the hydrologic regime include those processes necessary to sustain proper channel form and riparian, aquatic, and wetland habitats and to allow proper patterns of sediment, nutrient, and wood routing. This includes the timing, magnitude, duration, and spatial distribution of peak, high, and low flows.

3) Instream flows to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges;

4) Natural timing and variability of the water table elevation in meadows and wetlands;

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5) Diversity and productivity of native and desired non-native plant communities in riparian zones;

6) Riparian vegetation to:
   a) provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems;
   b) provide adequate summer and winter thermal regulation within the riparian and aquatic zones;
   c) help achieve rates of surface erosion, bank erosion, and channel migration characteristic of those under which the communities developed;

7) Riparian and aquatic habitats necessary to foster the unique genetic fish stocks that evolved within the specific geoclimatic region;

8) Habitat to support viable populations of native plant, invertebrate, and vertebrate aquatic and riparian-dependent species, including threatened and endangered species, that are well distributed within their historical ranges.

9) Habitat to support harvestable populations of native aquatic and riparian-dependent species of commercial, cultural, and recreational significance.

10) Habitat to support desired recreational fishing opportunities for non-native species where they will not further erode native species status or prevent attainment of objectives for native species.

Alternative 5

In addition to the DRFC elements common to all action alternatives, the following is the vision of the long-term (50-100 years) condition of the land under Alternative 5:

FOREST

In the *dry forest PVG*, successional and disturbance processes are maintained through vegetation management, endemic insect and disease disturbances, and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
60-70%	10-20%	15-25%

There are either large patches dominated by young forest and old multi-story forests within timber emphasis areas, or a mosaic of age classes composed of ponderosa pine and Douglas-fir in other emphasis areas (table C).

In the *moist forest PVG,* successional and disturbance processes are maintained through intensive vegetation management, endemic insect and disease disturbances, windthrow often aided by root rot, and fire. Forest species and composition are consistent with the following fire regime:

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Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
5-20%	20-40%	50-65%

There are either large patches of young forest and old multi-story forest within timber emphasis areas, or a mosaic of age classes in the other emphasis areas (table C). Seral western white pine dominates the young forest structural stage.

In the *cold forest PVG*, successional and disturbance processes are maintained through endemic and epidemic insect and disease disturbances, and minimal vegetation management. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
5-15%	5-15%	75-85%

There is a high abundance and persistence of old forest dominated by lodgepole pine and Douglas-fir in the multi-story structural stage. The young forest stages have a moderate component of seral whitebark pine and Engelmann spruce/subalpine fir. Stands are well distributed in a mosaic of age classes (table C).

The forest potential vegetation groups have an overall range of structural stages as follows:

Table C. Desired Structural Stages: Alt. 5

PVG	Regen	Young	Old Multi	Old Single	Other*
Distribution (expressed as a % of the PVG)					
Dry Within** Dry Outside**	5-15 10-20	30-40 25-35	10-20 20-30`	35-50 20-40	0-15
Moist Within** Moist Outside**	20-30 15-25	40-50 50-60	20-30 15-25	10-20 5-15	
Cold Within** Cold Outside**	15-25 15-25	35-45 45-55	25-35 20-30	5-15 5-10	1-2
Shade-Intolerant Species (expressed as a % of the structural stages)					
Dry	90-100	60-70	50-70	90-100	
Moist	75-85	70-75	50-75	90-100	
Cold	75-80	60-70	35-50	80-100	
***refers to understory of grasses, shrubs, forbs** ****Within=within timber emphasis areas; Outside=outside timber emphasis areas**					

Forest wildlife habitat. Forested wildlife emphasis areas have the necessary forest structure and composition, ecological processes, and ecosystem function to meet the needs of all species associated with forest communities. Areas of habitat are extensive to assure species distribution and densities associated with forest habitats. Forested land contains habitat attributes of old forests which connect with areas of similar vegetation. Natural Areas have high species endemism or biodiversity and contribute to moderate gains in species viability. Human activities are at levels that

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allow sufficient useable habitat for most species to be represented and well distributed in forested environments. Management activities occur primarily in areas of major disturbances. Roads are few.

In forest PVGs, other emphasis areas have the necessary forest structure and composition, ecological processes, and ecosystem function to meet the needs of most forest-dependent wildlife species, but species densities are low. Forested land contains habitat attributes of old forests which are mostly connected with areas of similar vegetation. Human activities are at levels that allow most species to maintain a desired distribution in forested environments. Management activities occur primarily in areas of major disturbances.

RANGELANDS

Within Livestock Emphasis Areas

Rangelands reflect a mosaic of multiple-aged shrubs, forbs, and native and exotic perennial grasses. There is a management emphasis on maintaining a grass-dominated plant community in the shrubland types for livestock production. Forbs and shrubs are a minor, but significant, part of the plant community. Seedings have been diversified by the addition of various forb and shrub forage species. New infestations of noxious weeds are not common across the landscape and existing large infestations are slowly declining.

Western juniper-dominated sites are rare across the rangelands. The exception is rock outcrops, ridges, mesas, or other sites not prone to fire which typically have shallow soil areas with little accumulation of fine fuels.

Microbiotic crust cover is improving in shallow soil areas or sites that have an inherent low potential for vascular plant cover. Microbiotic crusts are not declining in other rangeland plant communities. Prescribed burning and prescribed natural fire have maintained the more grass-dominated communities although the burning is not continuous and is prescribed as 'mosaic'. Altered sagebrush steppe has been converted to diverse perennial plant communities that provide forage production. Greenstripping and other fire breaks are apparent along roads and along the altered sagebrush steppe boundaries.

Outside Livestock Emphasis Areas

Same as Alternative 4 for the general description. The specific description by PVG is described below.

Potential Vegetation Groups (both within and outside Livestock Emphasis Areas)

Dry Grass Potential Vegetation Group

Within this group, nonlethal fires predominate on 70-90 percent of the area within livestock emphasis areas, and 40-60 percent of the area outside emphasis areas, burning in herbaceous vegetation at less than 25-year intervals. The remaining fires are lethal, or mixtures of nonlethal and lethal, causing mortality of overstory shrubs or conifers. Seventy to 90 percent of the area within livestock emphasis areas, and up to 80 percent of the area outside livestock emphasis areas, are dominated by native grasses and forbs without conifer and shrub encroachment.

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Dry Shrub Potential Vegetation Group

In this group, about 75-85 percent of the fires are lethal within livestock emphasis areas, and 85-95 percent are lethal outside these areas, causing overstory mortality in stages dominated by shrubs and conifers at 25- to 75-year intervals. On perennial bunchgrass dominated sites, non-lethal fires predominate at 25- to 75-year intervals.

Thirty to 50 percent of the area in this group is dominated by native grasses and forbs with an overstory layer of shrubs. Fifteen to 25 percent of the area within livestock emphasis areas is herbaceous-dominated, as is 5-15 percent of the area outside emphasis areas. The remaining areas are dominated by desirable exotic and native plant seedings, annual grasses or noxious weeds, and a small amount of closed shrub communities with declining herbaceous layers.

Cool Shrub Potential Vegetation Group

In this group, the dominant fire regime is lethal on 60-80 percent of the area within livestock emphasis areas and 80-95 percent of the lands outside emphasis areas. These lethal fires cause overstory mortality in stages dominated by shrubs and conifers at 25- to 150-year intervals, with higher frequencies on more productive sites. Twenty to 40 percent of the fires within livestock emphasis areas, and 5-15 percent of fires outside emphasis areas are nonlethal, occuring within herbaceous-dominated stages at intervals of less than 25 years.

Sixty to 80 percent of the area in this group is dominated by native grasses and forbs with an overstory layer of shrubs. Twenty to 40 percent of the area within the livestock emphasis areas, and 5-15 percent of the area outside emphasis areas contains mixtures of perennial grasses and forbs. Conifers are dominant on less than 5 percent of the area within livestock emphasis area, and on less than 30 percent of the land outside livestock emphasis areas.

Rangeland wildlife habitat. Within rangelands, wildlife emphasis areas have the necessary structure and composition, ecological processes, and ecosystem function to meet the needs of Federal and State listed and sensitive rangeland-dependent wildlife species. The distribution of different amounts and ages of shrubs, grassland, and woodland is approaching desired levels in a mosaic pattern. Rehabilitation or restoration of native bunchgrass is accomplished where site potential permits. Management activities to control exotics are frequent and concentrated. Blocks of habitats are more connected with areas of similar vegetation. Human activities are at a level that allows most species to maintain a desired distribution. Roads are few.

Other emphasis areas in rangelands may have the necessary structure and composition, ecological processes, and ecosystem functions to meet needs of all Federal and State listed and special status species dependent on rangeland habitat. Vegetation is appropriate for the site, with multiple age classes of shrubs and grass being common. Rehabilitation or restoration of native shrub and grass communities has been accomplished. Management activities to control exotic plants are frequent. These habitats are more fragmented and less connected due to changes in abundance of native vegetation. Areas may not be connected with other areas of similar vegetation to maintain species distribution and densities. Human activities are at a level that allows sufficient useable habitat for most species to be represented and maintain expected distribution, but some species densities may be low. In many areas roads are closed (seasonal or permanent) or relocated to increase habitat quality by reducing human disturbance; road densities are variable.

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SOCIAL AND ECONOMIC

Social and economic systems have adjusted to significant changes in the location, amounts and product mix of commodity and noncommodity outputs.

Where economic efficiency and biological capability direct land management toward commodity outputs, land allocations have significantly increased outputs of these commodities, and economic and social systems have adjusted accordingly.

Where land capability is more suited to support ecological values (such as endangered species), land allocations emphasize the economic and social values of protected biological resources, and economic and social systems have adjusted accordingly.

The role of Federal agencies in local communities has changed based on agency emphasis on the particular suite of goods and services emphasized in a particular area.

AQUATIC — RIPARIAN — WATERSHEDS

The DRFC for riparian areas, streams, lakes, soil, and road corridors in aquatic emphasis areas, is similar to the DRFC of alternatives 4 and 6.

There is no downward trend in riparian condition and function in timber emphasis areas. While large trees are rare, small to moderate sized trees provide some watershed protection. Many riparian areas remain open and without vegetation cover. Some areas are connected to their streams and upslopes and some (the more sensitive and less responsive areas) are fragmented and isolated. Some streams are low in productivity and have habitat that is simple and uniform. Structure is provided by small diameter wood in the smaller streams; structure is transient or absent in the larger, lower gradient streams. Substrate is fairly homogeneous and tends to be of finer size than is characteristic for the geoclimatic setting. Large and deep pools in the larger lower gradient streams are infrequent.

Large portions of the landscape in timber emphasis areas have minimal protective soil cover, organic matter and coarse woody material; most biomass is stored in small diameter trees and as litter. Vegetation growth and hydrologic function are moderately impaired. There is evidence of openings from old and new road corridors across the landscape. Large amounts of the landscape are open or partially open and next to the road corridors. The landscape appears fragmented. Riparian vegetation appears separate and disconnected from upslope vegetation.

There is no downward trend in riparian condition and function in livestock emphasis areas, where exotic grasses are dominant and shrubs are rare. Most riparian areas appear open and are minimally covered by vegetation. Some areas are connected to stream channel, floodplains, and subsurface flow networks, but most are disconnected from these processes. Woodlands are rare. Some streams are low in productivity, and have habitat that is simple and uniform. Structure is provided by exotic vegetation and infrequent shrubs. Substrate is fairly homogeneous and tends to be of finer size and more abundant than characteristic for the geoclimatic setting and stream type. Large deep pools in the larger lower gradient streams are infrequent. Many streams are wide and shallow.

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Large portions of the landscape in livestock emphasis areas have minimal protective soil cover and organic matter, mostly in the form of above ground biomass and shallow rooted plants. Soil and hydrologic function is moderately impaired.

Riparian areas in recreation emphasis areas are fragmented in areas of concentrated and developed recreation. Small openings are frequent because of trails and other developments. In undeveloped areas, riparian areas are resilient and functioning within condition characteristic for that valley bottom setting and vegetation type. Streams are generally productive and somewhat diverse, and areas of concentrated or developed use have bare or reinforced streambanks interspersed with vegetated and resilient streambanks. Structure is intermittent; substrate tends to be uniform in areas of concentrated use and of various sizes in areas of dispersed use. Habitat is fairly simple and uniform in concentrated use areas, and increasingly complex in areas of less use. Large deep pools are concentrated in some areas and absent in others.

New roads in some riparian areas within recreation emphasis areas are evident and stable, but overall roads in riparian areas are few. Old and new road corridors blend into the landscape as much as possible.

Aquatic species habitat. Restoration strategies have been implemented on nearly all high risk sites within aquatic and recreation emphasis areas, allowing recovery of watershed, riparian, water quality, and aquatic conditions characteristic for that geoclimatic setting. Improved aquatic habitat conditions allow threatened and endangered aquatic species populations to stabilize and expand into previously occupied habitat. Native aquatic species population strongholds are increasing basin-wide. Major river corridor conditions have improved to allow most species to achieve their complete life cycles.

The following DRFC applies to Forest Service- or BLM-administered lands identified in PACFISH and INFISH. The DRFC is to maintain or restore:

1) Water quality to a degree that provides for stable and productive riparian and aquatic ecosystems;

2) Stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic ecosystems developed;

3) Instream flows to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges;

4) Natural timing and variability of the water table elevation in meadows and wetlands;

5) Diversity and productivity of native and desired non-native plant communities in riparian zones;

6) Riparian vegetation to:
   a) provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems;
   b) provide adequate summer and winter thermal regulation within the riparian and aquatic zones;
   c) help achieve rates of surface erosion, bank erosion, and channel migration characteristic of those under which the communities developed;

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7) riparian and aquatic habitats necessary to foster the unique genetic fish stocks that evolved within the specific geoclimatic region;

8) habitat to support populations of well-distributed native and desired non-native plant, vertebrate, and invertebrate populations that contribute to the viability of riparian-dependent communities.

Alternative 6

In addition to the DRFC elements Common to All Action Alternatives, Alt. 6 is portrayed by a DRFC that is similar to that of Alt. 4. Acknowledging that in the short term (<50 years), conditions are likely to look different under Alt. 6 than they do under Alt. 4, it is anticipated that in the long term, conditions would look similar to those described under Alt. 4. Therefore, for the DRFC specific to Alt. 6, see Alt. 4.

Alternative 7

In addition to the DRFC elements common to all action alternatives, the following is the vision of the long-term (50-100 years) condition of the land under Alternative 7:

FOREST

In the *dry forest Potential Vegetation Group (PVG)*, successional and disturbance processes are maintained through endemic insect and disease disturbances, and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
50-70%	10-25%	15-30%

Within reserves, there is a high occurrence and persistence of young forest dominated by ponderosa pine in the regeneration and young forest structural stages. Stands are fairly well distributed in a mosaic of age classes (table E). Outside reserves, there is a moderate occurrence of old single story forest dominated by ponderosa pine with a moderate component of Douglas-fir and a minor component of grand fir. Vegetation management is used in addition to natural disturbances and fire to maintain successional and disturbance processes. Stands are fairly well distributed in a mosiac of age classes (table E).

In the *moist forest PVG*, successional and disturbance processes are maintained through endemic insect and disease disturbances, windthrow often aided by root rot, and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
5-20%	20-40%	50-65%

Within reserves, there is a high occurrence and persistence of regeneration, young forest, and old multi-story stages dominated by shade-intolerant species, grand fir/white fir, and Engelmann spruce/subalpine fir (table E). Outside the reserves there is a moderate occurrence and persistence of young forest consisting of western white pine, western larch and ponderosa pine with a

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minor component of grand fir. Vegetation management is used in addition to natural disturbances and fire to maintain successional and disturbance processes. Stands are distributed in a mosaic of age classes (table E).

In the *cold forest PVG*, successional and disturbance processes are maintained through fire and endemic insect and disease disturbances. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
5-20%	15-30%	55-75%

Within reserves, there is a high occurrence and persistence of regeneration, young forest, and old multi-story stages of Douglas-fir, lodgepole pine, and Engelmann spruce/subalpine fir. Stands are distributed in mosaics of age classes (table E). Outside reserves, the young forest stage is dominated by seral whitebark pine with a moderate component of Engelmann spruce/subalpine fir in a mosaic of age classes. Stands are distributed in large-patch mosaics of age classes (table E).

The potential vegetation groups have an overall range of structural stages as follows:

Table E. Desired Structural Stages: Alt.7

PVG	Regen	Young	Old Multi	Old Single	Other*
Distribution (expressed as a % of the PVG)					
Dry Within** Dry Outside**	20-30 10-20	45-55 25-35	10-20 20-30	5-15 20-40	0-15
Moist Within** Moist Outside**	15-25 15-25	40-50 50-60	15-25 15-25	10-20 5-15	
Cold Within** Cold Outside**	20-30 15-25	40-50 45-55	10-20 20-30	10-20 5-10	1-2
Shade-Intolerant species (expressed as a % of the structural stages)					
Dry	90-100	60-70	50-70	90-100	
Moist	75-85	70-75	50-75	90-100	
Cold	75-80	60-70	35-50	80-100	

***refers to understory of grasses, shrubs, forbs**
****Within=within reserves; Outside=outside reserves**

Forest wildlife habitat. Within reserves, habitat is maintained to contribute to biodiversity, species viability, and delisting of threatened, endangered, and special status species. All major vegetation types are included in large reserves, providing an adequate representation of wildlife habitats. Forested areas within reserves contain necessary structure, composition, and attributes of old forests. Reserves have often absorbed large disturbance events and impacts from activities adjacent to reserves and still provide sufficient habitat. Reserves of all vegetation types are present in more than one location so that large-scale disturbances are less likely to disrupt the intent of the reserve in the short term. Human activities are at levels that allows all species to maintain

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their distribution. Densities of species may be low, but all expected species are present. Road use restrictions are common to maintain species densities and prevent disturbances that will cause animals to be displaced.

Outside of reserves the DRFC for forested wildlife habitat is similar to that of Alternative 3.

RANGELANDS

Within Reserves

Where noxious weeds or other exotic plants have not dominated the vegetation types, rangelands (especially the cool shrub areas) reflect a diverse mosaic of multiple-aged shrubs, forbs, and native grasses. Seedings include native species, especially in the moist areas, and have become more diverse especially in the shrub component. Noxious weeds are increasing on the rangelands as a result of minimal control and due to the increasing competitiveness of noxious weeds with native plant species. The dry shrublands are especially affected by noxious weeds, with a majority already infested.

Western juniper encroachment onto dry grassland, dry and cool shrubland, and riparian areas, is retarded by natural fire where the understory vegetation provides adequate fine fuel to permit fire. Some juniper stands are being reduced in spatial extent by limited juniper cutting, especially those stands that (1) are of sufficient density that site biodiversity is being compromised, and (2) are not likely to be affected by wildfire. Western juniper presence is confined primarily, but not exclusively, to sites such as rock outcrops, ridges, mesas and other sites that are not fire prone, which typically are characterized by low fine fuel accumulation and shallow soils.

Microbiotic crust cover has improved in all rangeland types, with the exception of those dominated by altered sagebrush steppe. The frequency of fire in the altered sagebrush steppe has prevented substantial microbiotic crust cover from occurring.

Altered sagebrush steppe has occupied a majority of the dry shrub communities, especially the Wyoming sagebrush warm sites. Some altered sagebrush steppe areas, especially those in the more moist areas, are slowly moving toward a native plant community as native plants re-invade these areas. The slow conversion of altered sagebrush steppe sites to medusahead and yellow starthistle is apparent in some areas. Greenstripping and other fire breaks have been naturally colonized by some native species, although the seeded species is still dominant.

Outside Reserves

Same as Alternative 3, for the general description. The specific description by PVG is described below.

Potential Vegetation Groups (both within and outside Reserves)

Dry grass Potential Vegetation Group

Within this group, nonlethal fires predominate on 70-90 percent of the area within reserves, and 40-60 percent of the area outside reserves, burning in herbaceous vegetation at less that 25-year intervals. The remaining fires are lethal or mixtures of nonlethal and lethal, with mortality of over-

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story shrubs or conifers occurring. Seventy to 90 percent of the area within reserves areas, and 50-70 percent of the area outside reserves, are dominated by native grasses and forbs without conifer and shrub encroachment.

Dry Shrub Potential Vegetation Group

In this group, about 25-45 percent of the fires are lethal within reserves, and 85-95 percent are lethal outside reserves, causing overstory mortality in stages dominated by shrubs and conifers at 25- to 75-year intervals. On perennial bunchgrass dominated sites, nonlethal fires predominate at 25- to 75-year intervals.

Twenty to 40 percent of the area in this group within reserves is dominated by native grasses and forbs with an overstory layer of shrubs. Five to 15 percent of the area within reserves is herbaceous-dominated. The remaining area within reserves is dominated by cheatgrass and noxious weeds, dense sagebrush canopy areas, and seedings. Forty to 60 percent of the area outside of reserves in the dry shrub potential vegetation group is dominated by shrub stages with a healthy understory layer in which native grasses and forbs are well represented. Five to 20 percent of the area is dominated by native grass and forb communities outside of reserves. The remaining area outside reserves is dominated by closed shrub communities with declining herbaceous layers, by annual grasses or by seedings of exotic grasses, and by other plants.

Cool Shrub Potential Vegetation Group

In this group, 60-80 percent of the fires are lethal within reserves, and 80-95 percent of the fires are lethal ouside reserves. These lethal fires cause overstory mortality in stages dominated by shrubs and conifers at 25- to 150-year intervals, with higher frequencies on more productive sites. Twenty to 40 percent of the fires within reserves, and 5-15 percent of fires outside reserves are nonlethal, occurring within herbaceous-dominated stages at intervals of less than 25 years.

Fifty to 70 percent of the area in this group is dominated by shrub stages with a healthy understory layer in which native grasses and forbs are well represented. Twenty to 40 percent of the area within reserves, and 10-30 percent of the area outside reserves contains mixtures of perennial grasses and forbs. Conifers are dominant on 5-10 percent of the area within reserves, and less than 30 percent of the land outside reserves.

Rangeland wildlife habitat. All major rangeland cover types are included in the reserve system, providing representation of habitat and areas large enough to support all native species. Reserves represent the same habitats in several locations, to ensure that if a large disturbance event occurs in one reserve, the effects are short term relative to the communities represented in all reserves. Human activities are at levels that allow species to maintain expected distribution and abundance for the habitats represented. Few roads are located within reserves. Because of these conditions, biodiversity, species viability, and continued recovery of federally listed threatened and endangered species is occurring within reserves.

Rangeland habitat attributes outside of reserves are meeting the needs of endemic species, but not to the same extent as within reserves. Vegetation conditions are not barriers to movement of species between reserves. Conditions outside of reserves do not cause reserves to become islands of habitat. Human activities are at levels that allow all species to maintain distribution and abundance, but densities may be reduced. Use of roads are regulated as needed to maintain habitat effectiveness for species persistence.

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SOCIAL AND ECONOMIC

Social and economic systems have adjusted to significant changes in the location, amounts and product mix of commodity and noncommodity outputs from Federal lands in different parts of the basin.

Human use and activities are very low within reserves but increase with distance away from reserve boundaries. Because short-term restoration actions within reserves have been completed by 50-100 years, economic benefits are no longer derived from reserve restoration activities.

In areas most affected by reserves, economic and social adjustments have completed a shift away from commodity outputs and toward deriving the economic and social benefits of protected biological resources.

In areas more distant from reserves and corridors, economic and social systems have adjusted to stable outputs of commodities.

AQUATIC — RIAPARIAN — WATERSHEDS

Within Reserves

Riparian areas within reserves are resilient, diverse, and functioning within their site potential. Many less resilient, more sensitive areas are recovering. Tall trees, moderate or large in diameter, are fairly frequent within riparian areas. Riparian areas are covered by protective vegetation and generally connected with their streams and upslopes. In rangeland reserves, riparian area soils are dominated by native, deep-rooted plants, and shrubs are especially common along stream banks. Wetlands are prevalent across the lower gradient valley bottoms.

Streams within reserves are generally productive, having a diversity and complexity of habitat. Stream cover and structure from inputs of large wood and bank vegetation are abundant. Substrates consist of a variety of particle sizes, which accommodate the spawning and rearing needs of all species. Large, deep, and complex pools are common.

Most soils within reserves have protective cover, adequate levels of soil organic matter, and coarse woody material that is well distributed in varying sizes and plant parts. Soils also have adequate physical properties for vegetation growth and hydrologic function. Physical, chemical, and biological processes of all soils function similarly to comparable soils which have not been harmfully disturbed.

There is little evidence of openings from old road corridors across the landscape within reserves, in riparian areas or elsewhere, and no evidence of new openings from road corridors.

Aquatic species habitat: within reserves. Restoration strategies have been implemented on nearly all high-risk sites within reserve areas. This allows recovery of watershed, riparian, water quality and aquatic conditions characteristic for that geoclimatic setting. Improved aquatic habitat conditions allow threatened or endangered aquatic species populations to stabilize and expand into previously occupied habitat. Native aquatic species population strongholds have increased basin-wide. Major river corridor conditions allow near full expression of aquatic life histories.

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Outside of reserves
Riparian areas outside of reserves are mostly resilient and becoming diverse. Tall trees are uncommon in riparian areas. Most non-reserve riparian areas are connected to their upslopes and streams.

In rangelands outside of reserves, riparian area soils are covered by a mixture of exotic and native vegetation. Wetlands are visible but infrequent in the lower gradient valley bottoms.

Streams are moderately productive and complex. Large, deep and complex pools are present in many streams.

Many soils have protective cover, adequate levels of soil organic matter and coarse woody material.

The following DRFC also applies in Alternative 7:

1) Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species populations and communities are uniquely adapted.

2) Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact strongholds. These connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

3) Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

4) Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain in the range that maintains the biological, physical, and chemical integrity of the ecosystem, benefitting survival, growth, reproduction, and migration of individuals composing its aquatic and riparian communities.

5) Maintain and restore the sediment regime with which the aquatic system evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

6) Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distributions of peak, high, and low flows must be protected.

7) Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

8) Maintain and restore the species composition and structural diversity of plant communities in riparian zones and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of large wood sufficient to sustain physical complexity and stability.

9) Maintain and restore habitat to support well distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

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Appendix II

Common and scientific names of species.

Common name	Scientific name
Flora:	
African rue	*Peganum harmala*
Alder	*Alnus hill*
Bitter brush	*Purshia tridentata* (Pursh) DC.
Blue-leaved penstemon	*Penstemon glaucinus*
Broad-fruit mariposa	*Calochortus nitidus*
Brome-grass	*Bromus* L.
Buck rush	*Ceanothus cuneatus* (Hook.) T. & G.
Canada thistle	*Cirsium arvense*
Cheatgrass	*Bromus tectorum* L.
Clustered lady's-slipper	*Cypripedium fasciculatum*
Common crupina	*Crupina vulgaris*
Crenulate grape-fern	*Botrychium crenulatum*
Crested wheatgrass	*Agropyron cristatum* (L.) Gaertn.
Cronquist's stickseed	*Hackelia cronquistii*
Dalmatian toadflax	*Linaria dalmatica*
Diffuse knapweed	*Centaurea diffusa*
Douglas-fir	*Pseudotsuga menziesii* (Mirbel) Franco.
Dyers woad	*Isatis tinctoria*
Grand fir	*Abies grandis* (Dougl.) Forbes
Green-tinged paintbrush	*Castilleja chlorotica*
Halogeton	*Halogeton glomeratus*
Howellia	*Howellia aquatilis*
Howell's gumweed	*Grindelia howellii*
Huckleberries	*Vaccinium* L.
Iberian starthistle	*Centaurea iberica*
Idaho fescue	*Festuca idahoensis* Elmer
Juniper	*Juniperus* L.
Kentucky bluegrass	*Poa pratensis* L.
Knapweed	*Centaurea* L.
Leafy spurge	*Euphorbia esual* L.
Lemhi penstemon	*Penstemon lemhiensis*
Lodgepole pine	*Pinus contorta* Dougl.
Long-bearded mariposa-lily	*Calochortus longebarbatus* var. *longebarbatus*
Macfarlane's four-o'clock	*Mirabilis macfarlanei*
Malheur wire-lettuce	*Stephanomeria malheurensis*
Manzanita	*Arctostaphylos* Adans.
Matgrass	*Nardus stricta*
Mediterranean sage	*Salvia aethiopis*
Medusahead	*Taeniatherum caput-medusae*
Mountain hemlock	*Tsuga mertensiana* (Bong.) Carr.
Mt. Mazama collomia	*Collomia mazama*

Mulford's milk-vetch	*Astragalus mulfordiae*
Musk thistle	*Carduus nutans*
Orange hawkweed	*Hieracium aurantiacum*
Osgoodmountains milkvetch	*Astragalus yoder-williamsii*
Palouse goldenweed	*Haplopappus liatriformis*
Payson's milkvetch	*Astragalus paysonii*
Peck's mariposa-lily	*Calochortus longebarbatus* var. *Peckii*
Perennial pepperweed	*Lepidium latifolium*
Picabo milkvetch	*Astragalus oniciformis*
Ponderosa pine	*Pinus ponderosa* Dougl.
Purple loosestrife	*Lythrum salicaria*
Purple starthistle	*Centaurea calcitrapa*
Pygmy monkeyflower	*Mimulus pygmaeus*
Rush skeletonweed	*Chondrilla juncea*
Russian knapweed	*Centaurea repens*
Sagebrush	*Artemisia* L.
Saltcedar	*Tamarix ramosissima*
Scotch thistle	*Onopordum acanthium*
Spalding's campion	*Silene spaldingii*
Spiny cocklebur	*Xanthium spinosum*
Spotted knapweed	*Centaurea maculosa*
Squarrose knapweed	*Centaurea virgata*
St. Johnswort	*Hypericum perforatum*
Subalpine fir	*Abies lasiocarpa* (Hook.) Nutt.
Suksdorf's lomatium	*Lomatium suksdorfii*
Sulfur cinquefoil	*Potentilla recta*
Syrian bean-caper	*Zygophyllum fabago*
Tansy ragwort	*Senecio jacobaea*
Thompson's clover	*Trifolium thompsonii*
Twin-spike moonwort	*Botrychium paradoxum*
Upward-lobed moonwort	*Botrychium ascendens*
Washington monkeyflower	*Mimulus washingtonensis* var. *Washingtonensis*
Washington polemonium	*Polemonium pectinatum*
Weak milk-vetch	*Astragalus solitarius*
Western hemlock	*Tsuga heterophylla* (Raf.) Sarg.
Western juniper	*Juniperous occidentalis* Hook.
Western redcedar	*Thuja plicata* Donn.
Western white pine	*Pinus monticola* Dougl.
Wheat	*Triticum aestivum* L.
White bark pine	*Pinus albicaulis* Engelm.
White fir	*Abies concolor* (Gord. & Glend.) Lindl.
Whitetop	*Cardaria* spp.
Willow	*Salix* L.
Yellow hawkweed	*Hieracium pratense*
Yellow starthistle	*Centaurea solstitialis*
Annual, Biennial Forb:	
	Alyssum desertorum
	Amisimkia intermedia

	Blepharipappus scaber *Clarkia pulchella* *Coldenia grandiflora* *Collinsia parviflora* *Collomia grandiflora* *Cordylanthus ramosus* *Cryptantha affinis* *Cryptantha ambigua* *Descurainia pinnata* *Descurainia richardsonii* *Draba verna* *Epilobium minutum* *Epilobium paniculatum* *Eriogonum vimineum* *Erodium cicutarium* *Euphorbia* spp. *Galium bifolium* *Gayophytum humile* *Gapophytum nuttallii* *Hemizonia pungens* *Holosteum umbellatum* *Lactuca ludoviciana* *Lagophylla ramosissima* *Layia galndulosa* *Lepidium perfoliatum* *Linanthus harknessi* *Lupinus microcarpus* *Madia gracilis* *Madia sativa* *Microsteris gracilis* *Mimulus breweri* *Montia perfoliata* *Navarretia* sp. *Orthocarpus tenuifolius* *Phacelia linearis* *Plectritis macrocera* *Polemonium micranthum* *Polygonum majus* *Ranunculus testiculatus* *Ranunculus occidentalis* *Sanguisorba minor* *Sisymbrium altissimum* *Taraxacum ceratophorum* *Tragopogon dubius* *Verbascum thapsus*
Annual Grass:	*Agrostis interrupta* *Bromus brizaeformis* *Bromus japonicus*

	Bromus mollis *Bromus tectorum* *Festuca bromoides* *Festuca microstachys* *Festuca octoflora* *Taeniatherum asperum*
Perennial Forb:	*Achillea millefolium* *Agoseris glauca* *Agoseris grandiflora* *Allium acuminatum* *Allium douglasii* *Antennaria rosea* *Antennaria dimorpha* *Arabis hoboelii* *Arabis puberula* *Arabis sparsiflora* *Aster campestris* *Astragalus beckwithii* *Astragalus curvicarpus* *Astragalus filipes* *Astragalus lentiginosus* *Astragalus prushii* *Astragalus reventus* *Astragalus stenophyllus* *Balsamorhiza careyana* *Balsamorhiza sagittata* *Calochortus macrocarpus* *Castilleja applegatei* *Castilleja chromosa* *Chaenactis douglasii* *Cheilanthes gracillima* *Crepis acuminata* *Crepis intermedia* *Erigeron bloomeri* *Erigeron elegantulus* *Erigeron filifolius* *Erigeron linearis* *Erigeron poliospermus* *Erigeron pumilus* *Eriogonum heracleoides* *Eriogonum microthecum* *Eriogonum niveum* *Eriogonum ovalifolium* *Eriogonum sphaerocephalum* *Eriogonum strictum* *Eriogonum thymoides* *Eriogonum umbellatum* *Eriophyllum lanatum*

	Fritillaria pudica *Geum campanulatum* *Hydrophyllum capitatum* *Leptodactylon pungens* *Linum perenne* *Lithophragma bulbifera* *Lomatium canbyi* *Lomatium cous* *Lomatium macrocarpum* *Lomatium triternatum* *Lupinus caudatus* *Lupinus laxiflorus* *Lupinus lepidus* *Mertensia longiflora* *Microseris nutans* *Microseris troximoides* *Orobanche uniflora* *Penstemon humilis* *Penstemon gracilis* *Penstemon laetus* *Penstemon richardsoni* *Penstemon speciosus* *Petalostemon ornatum* *Phacelia hastata* *Phlox douglasii* *Phlox hoodii* *Phlox longifolia* *Potentilla glandulosa var. intermidia* *Ranunculus occidentalis* *Senecio canus* *Senecio integerrimus* *Sisyrinchium douglasi* *Sisyrinchium idahoense* *Stellaria americana* *Stellaria nitens* *Trifolium dubium* *Trifolium macrocephalum* *Trifolium microcephalum* *Zygadenus paniculatus*
Perennial Grass:	*Agropyron saxocpla* *Agropyron smithii* *Agropyron spicatum* *Bromus carinatus* *Danthonia unispicata* *Elymus cinereus* *Keoleria cristata* *Oryzopsis humenoides* *Poa ampla*

	Poa bulbosa
	Poa compressa
	Poa cusickii
	Poa pratensis
	Poa sandbergii
	Sitanion hystrix
	Stipa columbiana
	Stipa comata
	Stipa occidentalis
	Stipa thurberiana
Sedge:	
	Carex rossii
	Carex geyeri
	Kobresia simpliciuscula
Shrub:	
	Artemisia arbuscula
	Atremisia tridentata spp. *tridentata*
	Atremisia tridentata ssp. *wyomingensis*
	Artemisia tridentata ssp. *vaseyana*
	Artemisia rigida
	Cercocarpus ledifolius
	Chrysothamnus nauseosus
	Chrysothamnus viscidiflorus
	Grayia spinosa
	Holodiscus dumosus
	Purshia tridentata
	Ribes cereum
	Symphoricarpos oreophilus
	Tetradymia canescens
	Tetradymia glabrata
Lichen:	*Texosporium sancti-jacobi*
Invertebrates:	
Arachnida, Pseudoscorpionida	
Gastropoda	*Apochtonius malheuri*
	Acroloxus coloradensis
	Cryptomastix magnidentata
	Discus marmorensis
	Megomphix lutarius
	Monadenia felis minior
	Oreohelix idahoensis idahoensis
	Oreohelix jugalis
	Oreohelix nevadensis
	Oreohelix strigosa delicata
	Oreohelix strigosa honiogyra
	Oreohelix vortex
	Oreohelix waltoni

Insecta, Coleopatera	*Agonum belleri*
	Cicindela arenicola
	Glacicavicola bathyscoides
	Nebria gebleri fragariae
	Nebria vandykei wyeast
Insecta, Lepidoptera	*Charidryas acastus dorothyea*
	Euphilotes rita mattonii
	Limenitis archippus lahontani
	Polites sabuleti sinemaculata
	Polites mardon
Insecta, Orthopera	*Acrolophitus pulchellus*
Mollusks:	
Banbury Springs lanx	*Lanx* n. sp. 1
Snake River physa	*Physa natricina*
Idaho springsnail	*Pyrgulopsis idahoensis*
Bliss Rapids springsnail	*Taylorconcha serpenticola*
Desert valvata	*Valvata utahensis*
Vertebrates:	
Fish:	
Bass	*Micropterus* spp.
Bull trout	*Salvelinus confluentus*
Brook trout	*Salvelinus fontinalis*
Chinook salmon	*Oncorhynchus tshawytscha*
Goose Lake sucker	*Catostomus occidentalis lacusanserinus*
Klamath largescale sucker	*Catostomus snyderi*
Lahontan cutthroat trout	*Oncorhynchus clarki henshawi*
Leatherside chub	*Gila copei*
Lost River sucker	*Deltistes luxatus*
Malheur sculpin	*Cottus bairdi* ssp.
Margined sculpin	*Cottus marginatus*
Oregon Lakes tui chub	*Gila bicolor oregonensis*
Pacific lamprey	*Lampetra tridentata*
Pit-Klamath Brook lamprey	*Lampetra lethophaga*
Pygmy whitefish	*Prosopium coulteri*
Rainbow trout	*Oncorhynchus mykiss*
Redband trout	*Oncorhynchus mykiss* ssp.
Shorthead sculpin	*Cottus confusus*
Shortnose sucker	*Chasmistes brevirostris*
Slender sculpin	*Cottus tenuis*
Sockeye salmon	*Oncorhynchus nerka*
Steelhead	*Oncorhynchus mykiss mykiss*
Torrent sculpin	*Cottus rhotheus*
Walleye	*Stizostedion vitreum vitreum*
Westslope cutthroat trout	*Oncorhynchus clarki lewisi*

Wood River Bridgelip sucker	*Catostomus columbianus hubbsi*
Wood River sculpin	*Cottus leiopomus*
Yellowstone cutthroat trout	*Oncorhynchus clarki bouvieri*
Birds:	
American kestrel	*Falco sparverius*
American robin	*Turdus migratorius*
Ash-throated flycatcher	*Myiarchus cinerascens*
Bald eagle	*Haliaeetus leucocephalus*
Band-tailed pigeon	*Columba fasciata*
Bank swallow	*Riparia riparia*
Barn swallow	*Hirundo rustica*
Barred owl	*Strix varia*
Black-backed woodpecker	*Picoides arcticus*
Black-billed magpie	*Pica pica*
Black-capped rosy finch	*Leucosticte arctoa*
Black-chinned hummingbird	*Archilochus alexandri*
Black-throated gray warbler	*Dendroica nigrescens*
Blue grouse	*Dendragapus obscurus*
Bobolink	*Dolichonyx oryzivorus*
Bohemian Waxwing	*Bombycilla garrulus*
Boreal owl	*Aegolius funereus*
Brewer's blackbird	*Euphagus cyanocephalus*
Brewer's sparrow	*Spizella breweri*
Broad-tailed hummingbird	*Selasphorus platycercus*
Burrowing owl	*Athene cunicularia*
Bushtit	*Psaltriparus minimus*
Canyon Wren	*Catherpes mexicanus*
Cedar Waxwing	*Bombycilla cedrorum*
Chestnut-backed chickadee	*Parus rufescens*
Chipping sparrow	*Spizella passerina*
Chukar	*Alectoris chukar*
Cliff swallow	*Hirundo pyrrhonota*
Columbia sharp-tailed grouse	*Tympanuchus phasianellus columbianus*
Common loon	*Gavia immer*
Common nighthawk	*Chordeiles minor*
Common poorwill	*Phalaenoptilus nuttallii*
Common raven	*Corvus corax*
Common snipe	*Gallinago gallinago*
Cooper's hawk	*Accipiter cooperii*
Downy woodpecker	*Picoides pubescens*
Dusky flycatcher	*Empidonax oberholseri*
European starling	*Sturnus vulgaris*
Ferruginous hawk	*Buteo regalis*
Flammulated ow	*lOtus flammeolus*
Golden eagle	*Aquila chrysaetos*
Grasshopper sparrow	*Ammodramus savannarum*
Gray flycatcher	*Empidonax wrightii*

Gray partridge	*Perdix perdix*
Great horned owl	*Bubo virginianus*
Greater sandhill crane	*Grus canadensis tabida*
Great gray owl	*Strix nebulosa*
Green-tailed towhee	*Pipilo chlorurus*
Hammond's flycatcher	*Empidonax hammondii*
Harlequin duck	*Histrionicus histrionicus*
Horned lark	*Eremophila alpestris*
House finch	*Carpodacus mexicanus*
Lark bunting	*Calamospiza melanocorys*
Lark sparrow	*Chondestes grammacus*
Lazuli bunting	*Passerina amoena*
Lewis' woodpecker	*Melanerpes lewis*
Loggerhead shrike	*Lanius ludovicianus*
Long-billed curlew	*Numenius americanus*
Long-eared owl	*Asio otus*
Merlin	*Falco columbarius*
Mountain bluebird	*Sialia currucoides*
Mountain chickadee	*Parus gambeli*
Mountain quail	*Oreortyx pictus*
Mourning dove	*Zenaida macroura*
Northern flicker	*Colaptes auratus*
Northern goshawk	*Accipiter gentilis*
Northern pygmy-owl	*Glaucidium gnoma*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Northern shrike	*Lanius execubitor*
Northern spotted owl	*Strix occidentalis caurina*
Olive-sided flycatcher	*Contopus borealis*
Pileated woodpecker	*Dryocopus pileatus*
Pine siskin	*Carduelis pinus*
Pinyon jay	*Gymnorhinus cyanocephalus*
Prairie Falcon	*Falco mexicanus*
Pygmy nuthatch	*Sitta pygmaea*
Red-eyed vireo	*Vireo olivaceus*
Red-naped sapsucker	*Sphyrapicus nuchalis*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-necked pheasant	*Phasianus colchicus*
Rock wren	*Salpinctes obsoletus*
Rough-legged hawk	*Buteo lagopus*
Rufous hummingbird	*Selasphorus rufus*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Sage grouse	*Centrocercus urophasianus*
Sage sparrow	*Amphispiza belli*
Sage thrasher	*Oreoscoptes montanus*
Sharp-shinned hawk	*Accipiter striatus*
Short-eared owl	*Asio flammeus*
Southern red-backed vole	*Clethrionomys gapperi*
Spotted sandpiper	*Actitis macularia*

Steller's Jay	*Cyanocitta stelleri*
Swainson's hawk	*Buteo swainsoni*
Three-toed woodpecker	*Picoides tridactylus*
Townsend's solitaire	*Madestes townsendi*
Townsend's Warbler	*Dendroica townsendi*
Tree swallow	*Tachycineta bicolor*
Turkey vulture	*Cathartes aura*
Upland sandpiper	*Bartramia longicauda*
Vaux's swift	*Chaetura vauxi*
Veery	*Catharus fuscescens*
Vesper sparrow	*Pooecetes gramineus*
Violet-green swallow	*Tachycineta thalassina*
Western bluebird	*Sialia mexicana*
Western meadowlark	*Sturnella neglecta*
Western red-backed vole	*Clethrionomys californicus*
Western screech owl	*Otus kennicottii*
Western snowy plover	*Charadrius alexandrinus nivosus*
Western tanager	*Piranga ludoviciana*
White-breasted nuthatch	*Sitta carolinensis*
White-headed woodpecker	*Picoides albolarvatus*
White-winged crossbill	*Loxia leucoptera*
Wild turkey	*Meleagris gallopavo*
Willet	*Catoptrophorus semipalmatus*
Williamson's sapsucker	*Sphyrapicus thyroideus*
Willow flycatcher	*Empidonax traillii*
Wilson's warbler	*Wilsonia pusilla*
Winter wren	*Troglodytes troglodytes*
Wood duck	*Aix sponsa*
Woodpecker	*Picoides* spp.
Yellow-billed cuckoo	*Coccyzus americanus*
Yellow-breasted chat	*Icteria virens*
Yellow-rumped Warbler	*Dendroica coronata*
Yellow warbler	*Dendroica petechia*
Mammals:	
American badger	*Taxidea taxus*
American marten	*Martes americana*
Black bear	*Ursus americanus*
Black-tailed jackrabbit	*Lepus californicus*
Bobcat	*Lynx rufus*
Bushy-tailed woodrat	*Neotoma cinerea*
California bighorn sheep	*Ovis canadensis californiana*
Chipmunk	*Tamias* spp.
Common porcupine	*Erethizon dorsatum*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus maniculatus*
Domestic horse (Feral)	*Equus caballus*
Elk	*Cervus elaphus*

Fisher	*Martes pennanti*
Fringed myotis	*Myotis thysanodes*
Golden-mantled ground squirrel	*Spermophilus lateralis*
Gray wolf	*Canis lupus*
Great basin pocket mouse	*Perognathus parvus*
Grizzly bear	*Ursus arctos*
Hoary bat	*Lasiurus cinereus*
Least chipmunk	*Tamias minimus*
Little brown myotis	*Myotis lucifugus*
Long-eared myotis	*Myotis evotis*
Long-legged myotis	*Myotis volans*
Long-tailed weasel	*Mustela frenata*
Lynx	*Lynx lynx*
Moose	*Alces alces*
Mountain lion	*Felis concolor*
Mountain (or bighorn) sheep	*Ovis canadensis*
Mule or black-tailed deer	*Odocoileus hemionus*
Northern flying squirrel	*Glaucomys sabrinus*
Northern grasshopper mouse	*Onychomys leucogaster*
Ord's kangaroo rat	*Dipodomys ordii*
Pale western big-eared bat	*Plecotus townsendii pallescens*
Pallid bat	*Antrozous pallidus*
Pinon mouse	*Peromyscus truei*
Pronghorn antelope	*Antilocapra americana*
Pygmy rabbit	*Brachylagus idahoensis*
Rocky Mountain elk	*Cervus elaphus nelsonii*
Rocky Mountain gray wolf	*Canis lupis irremotus*
Silver-haired bat	*Lasionycteris noctivagans*
Spotted bat	*Euderma maculatum*
Squirrel	*Ammospermophilus* spp.
Townsend's big-eared bat	*Plecotus townsendii*
Townsend's ground squirrel	*Spermophilus townsendii*
Washington ground squirrel	*Spermophilus washingtoni*
Western small-footed myotis	*Myotis ciliolabrum*
White tail deer	*Odocoileus virginianus*
White-tailed jack rabbit	*Lepus townsendii*
Wolverine	*Gulo gulo*
Woodland caribou	*Rangifer tarandus caribou*
Yellow-pine chipmunk	*Tamias amoenus*
Yuma Myotis	*Myotis yumanensis*

Amphibians and Reptiles:

Coeur d'Alene salamander	*Plethodon idahoensis*
Common garter snake	*Thamnophis sirtalis*
Desert horned lizard	*Phrynosoma platyrhinos*
Gopher snake	*Pituophis melanoleucus*
Longnose leopard lizard	*Gambelia wislizenii*
Long-toed salamander	*Ambystoma macrodactylum*

Mojave black-collared lizard	*Crotaphytus bicinctores*
Night snake	*Hypsiglena torquata*
Northern leopard frog	*Rana pipiens*
Pacific treefrog	*Pseudacris regilla*
Painted turtle	*Chrysemys picta*
Racer	*Coluber constrictor*
Rubber boa	*Charina bottae*
Sagebrush lizard	*Sceloporus graciosus*
Sharp-tailed snake	*Contia tenuis*
Short-horned lizard	*Phrynosoma douglassii*
Side-blotched lizard	*Uta stansburiana*
Southern alligator lizard	*Elgaria multicarinatas*
Spotted frog species A	*Rana pretiosa* sp. A
Spotted frog species B	*Rana pretiosa* sp. B
Striped whipsnake	*Masticophis taeniatus*
Tailed frog	*Ascaphus truei*
Western fence lizard	*Sceloporus occidentalis*
Western pond turtle	*Clemmys marmorata*
Western rattlesnake	*Crotalus viridis*
Western skink	*Eumeces skiltonianus*
Western toad	*Bufo boreas*
Woodhouse's toad	*Bufo woodhousii*

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The Evaluation of EIS Alternatives by the Science Integration Team describes the outcomes, interactions, effects, and consequences likely to result from implementing seven different management strategies on Forest Service (FS) and Bureau of Land Management (BLM) administered lands within the Interior Columbia Basin and portions of the Klamath and Great Basins. Two environmental impact statement teams developed seven alternative approaches to the management of forest, rangeland, aquatic, and watershed systems of FS- and BLM- administered lands. The alternatives varied from continuation of current management, to managing biodiversity within a network of large reserves, to actively managing to restore ecosystem health and integrity. Continuing with current management direction, in the absence of interim protection measures, results in continued declining trends in ecological integrity and increasing risk to species. No single alternative was found to result in improved outcomes for all species, reduced risk to ecological integrity, and improved resiliency for social and economic systems. Alternatives that prioritize activities to restore and/or maintain ecological integrity and simultaneously provide desired goods and services within the capability of the ecosystem appear to have favorable trends in most species outcomes, landscape functions, and resiliency in social and economic systems. The Draft and Final Environmental Impact Statements are expected to differ to some extent from the preliminary Draft Environmental Impact Statement analyzed for this evaluation.